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# COTTON

with which is combined

BOSTON JOURNAL OF COMMERCE AND TEXTILE INDUSTRIES and SOUTHERN MILLS.

**Devoted to the Manufacture of Textiles.**

Vol. 74, No. 7. ATLANTA, GA., MAY, 1910. 10 Cents a Copy.

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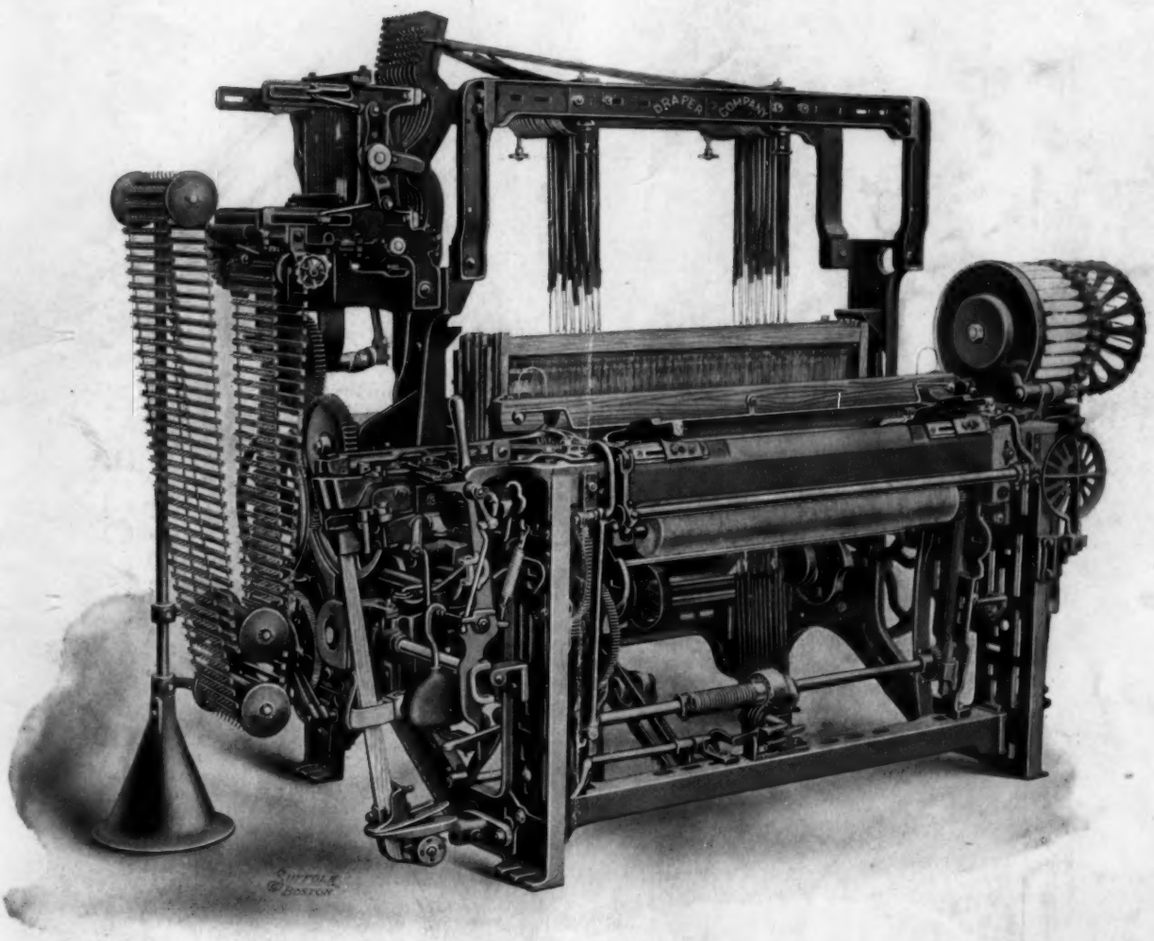


## NORTHROP DOBBY LOOM.

**COMMON LOOMS, MARCH, 1910, ON THE WAY TO THE FOUNDRY.**
**DRAPER COMPANY, HOPEDALE, MASS.**

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BOSTON JOURNAL OF COMMERCE AND TEXTILE INDUSTRIES and SOUTHERN MILLS.

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## THE JOBBING SITUATION.

In the Worth Street section of New York jobbing houses and dry goods commission men there is a distinct undertone of confidence and encouragement. Immediately after the announcement of the Tefft-Weller Co. reorganization a thorough canvass was made of the leading selling houses and jobbers to ascertain the exact attitude of this important department of the textile industry. Many individuals prominent in the selling end were blue and discouraged because their immediate business was profitless and the records for the past three or four months showed a balance on the wrong side of the ledger; but the balance of evidence was decidedly in favor of the hopeful conclusion expressed in the opening sentence.

John Claflin, president of the United Dry Goods Co. and head of H. B. Claflin Co., whose opinions are highly regarded, stated emphatically that he was hopeful and optimistic; he believes that conditions are working back to both wholesalers and jobbers and that shortly the beneficial effects of a good retail business, which has existed all the past month or six weeks on account of the seasonable weather throughout the country, will be felt with dynamic force in the industry. Mr. Claflin is a decided bull on general business conditions in this country, and believes that the Tefft-Weller incident is an exception rather than barometric factor. Mr. Claflin stated: "The reorganization of the Tefft-Weller Co. will have no effect on the cotton goods industry. The firm will reorganize with increased capital and will be able to continue business at a profit."

Tefft-Weller Co.'s difficulties were due entirely to misjudging conditions last fall and stocking up heavily with goods in anticipation of a record season. Many other houses did the same thing, but because of greater working capital and broader credit they are able to finance this period of depression, and it is the opinion of prominent cotton jobbers that there will be no further announcements of a similar nature. This concern's condition has been suspected for over a month and the actual publication of the formal announcement caused but very little uneasiness in Worth Street.

The advisory board that has been formed, consisting of A. D. Juilliard, of A. D. Juilliard & Co.; Cornelius N. Bliss, of Bliss, Fabyan & Co.; William DeF. Haines, of Lawrence & Co.; C. L. Bausher, late of C. L. Bausher & Co., and Woodbury Langdon, of Joy, Langdon & Co., is a representative body of commission men and virtually a committee of creditors. The lines of fabrics sold by these commission houses have been handled extensively by the embarrassed firm. On January 1st, assets were $3,471,602 and liabilities $1,960,015. There is a good margin of assets, but they are not liquid or quick assets and the pressure of the creditors effected a compromise resulting in the formation of the advisory board.

J. Spencer Turner Co. are more hopeful than they

have been for some months, and a member of that firm expressed the opinion that six months from date the tables would be turned and buyers would be scrambling and bidding up prices as they did three and four years ago. The mills whose products are sold by this company, are suffering drastic curtailment. At the Stark Mills all of the looms making 8 to 12-ounce "Stark" ducks and "Perfection" ducks are idle; one of the Southern mills is closed down, and curtailment schedules are in operation in the other mills in the South. The Baltimore mills are more fortunate on account of export orders for belting and other ducks. A large selling house for a gingham mill reported a much better demand for staple ginghams since the Amoskeag Mills reduced prices on some of their colored goods. Southern ginghams seem to be in better request. The reduction in A. C. A. ticking from 14 to 12½ cents has given quite a fillip to this market.

The keynote of the entire situation is the law of supply and demand. The action of the North Carolina manufacturers, at their recent meeting, is the most hopeful development since the period of high cotton began. If the mills will curtail and not accumulate unsold goods the economic laws of supply and demand will speedily adjust the situation. Buyers have been holding off from week to week, and from month to month because they believed that the increased spindleage and half-hearted curtailment would create large stocks of goods to be sacrificed later at bargain counter prices. Now that such a prominent and representative association of cotton manufacturers as met at Greensboro, N. C., has shown a decided and unwavering determination to curtail vigorously and to influence other associations to do likewise, buyers will be more inclined to enter the market. What is needed by cotton manufacturers to-day is courage! Courage to take a decided stand and not to accumulate a stock of unsold goods! Courage to influence the selling house not to accept orders at a loss! Courage to prepare for the great, broad market, both domestic and export, that is sure to develop ere another year.

## SEQUEL OR COINCIDENCE.

Coincident with the publication of the editorial in the April issue on "Combination, the solution of the cotton mill problem," Spencer Trask & Co., prominent bond dealers and investment brokers of New York City, announced the formation of the Frisbie & Stansfield Knitting Co. of Utica, N. Y., with a capitalization of $2,500,000, to consolidate four large New York State knitting mills. This prominent firm of financiers underwrote the securities and placed the entire issue of 7 per cent. preferred stock at par among their clientele of private investors. The economies to be gained by this consolidation are very large, and the officers of the corporation have no hesitation in predicting a 50 per cent. increase in net earnings within two years under one management of the four plants. There will be no duplication of purchasing expenses or selling costs, and one executive board will accomplish more than four boards did under the individual management previous to this combination.

The offering of stock was well received by the investing public and the bankers are very much pleased with the success of their initial efforts in consolidating textile mills. In fact, it is rumored in Wall Street that this firm will shortly announce the consolidation of a large number of woolen and worsted mills operating in the middle Atlantic group of States, and they feel confident that capital stock of textile mills will have a broad market among the more conservative classes of investors.

Lockwood, Greene & Co. of Boston, who reported on the valuation of the properties that went into the consolidation, to Spencer Trask & Co., concluded their report as follows: "The textile industry, as a whole, is one of the most stable in this country. Upon it the economic success of many communities is entirely based, and we believe that it shows less fluctuation, over a long period of years, than any other industry. Added to this is the further fact that the per capita use of cotton goods is on the increase in this country and especially is this true in the line of cotton knit goods. The product which is being manufactured in these mills is a staple line of goods, not subject to the fluctuations of taste or fashion, except in minor detail."

We repeat the sentiments expressed in last month's editorial that the cotton industry is on the verge of a broad expansion, and the magic wand of the financier and economist is soon to influence corporate management of the textile mills and groups of mills.

## FORECAST OF PROGRAM, AMERICAN COTTON MANUFACTURERS ASSOCIATION.

The forthcoming convention of the American Cotton Manufacturers' Association to be held in Charlotte, N. C., on Tuesday and Wednesday, May 17th and 18th, promises to eclipse in magnitude any similar meeting that has been held in years. The local entertainment committee has been busy for several weeks back arranging the social and other features that come under their supervision. These have been so arranged that they do not conflict with the regular program. The committee in charge of the general program has prepared a forecast of the exercises as follows:

THE PROGRAM.

TUESDAY, MAY 17.

10:00 A. M.—Call to order by President Lewis W. Parker.

Prayer—Rev. Harris Mallinckrodt, rector Saint Peter's Episcopal Church.

Address of Welcome—Hon. T. W. Hawkins, Mayor of Charlotte.

Reply to Address of Welcome—Mr. T. H. Rennie, Pell City, Ala.

Annual Address—President Lewis W. Parker.

Address—"Warehousing Cotton in the South," L. H. Bullard, Gulf Compress Co., Memphis, Tenn.

Discussion—Led by T. B. Stackhouse, President Standard Warehouse Co., Columbia, S. C.; W. D. Nesbitt, President Warrant Warehouse Co., Birmingham, Ala.

Address—"Excess Tare on Cotton," John A. Law, President Saxon Mills, Spartanburg, S. C.

Discussion.

ADJOURN.

AFTERNOON SESSION.

2:30 P. M.—Address—"The Development of the Cutting-Up Trade in the South," H. R. Beane, President The Peter Hill Co., Atlanta, Ga.

Report of Sales Notes Committee—Lewis W. Parker, Chairman, Greenville, S. C.

Discussion.

Report of Cotton Exchange Committee—Capt. E. A. Smyth, Chairman, Greenville, S. C.

Discussion.

ADJOURN.

WEDNESDAY, MAY 18.

10:00 A. M.—Call to order by President Lewis W. Parker.

Address—"Coal and Its Economic Use in Cotton Mills," J. S. Burrows, Fuel Expert, Castner, Curran & Bullitt, Norfolk, Va.

Discussion.

Discussion of General Topics.

BUSINESS SESSION.

For Active Members Only.

Report of Secretary and Treasurer.

Report of Committee on Resolutions.

New Business.

Election of Officers.

ADJOURN.

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RULES TO GOVERN THE CONVENTION.

1. The deliberations of this body will be governed by the Manual of Rules in use by the United States Senate.

2. Members addressing the chair will please announce their name and State to which they belong, in order to receive proper recognition.

3. Remarks by members on the floor shall be limited to 10 minutes, and additional time shall be granted by consent of the Convention. Under no circumstances shall an extension beyond 30 minutes be granted except by unanimous consent.

4. No member shall be permitted to speak twice on the same subject except by consent of the Convention.

5. All resolutions to the Convention shall be presented in duplicate, signed by the proponent and handed to the Secretary, to be by him referred to the President without reading or debate.

6. Each active member shall be entitled to vote or speak on any matter presented before the Convention.

7. Discussion of any subject may be terminated at any time by vote of the Convention.

It has been found that the large number of papers presented before previous conventions has interfered with general discussion by the members, and in order to furnish opportunity for a free discussion of the subjects on the program and any others that may come before the Convention the regular papers have been largely reduced. It is hoped the members will make good use of the time allotted to "Discussion." The papers will be printed in advance and copies sent to members on request.

The usual reduced rates, on the certificate plan, will be allowed by the railroads. It is necessary that a certificate be secured at the time of purchase of the going ticket. A representative of the railway companies will vise the certificate in Charlotte, thus enabling the holder to secure the benefit of the reduced rate for the round trip.

SOCIAL FEATURES.

TUESDAY.

4:00 P. M.—Professional Baseball.

5:00 P. M.—Reception Complimentary to Visiting Ladies.

TUESDAY NIGHT.

Vaudeville at Academy of Music.

Professional Wrestling Match at the Auditorium.

WEDNESDAY MORNING.

Automobile and Carriage Drives for the Visiting Ladies over the city, to Independence and Latta Parks.

WEDNESDAY AFTERNOON.

2:00 P. M.—Barbecue and Dance at Lakewood Park.

Professional Baseball.

THURSDAY.

Trip to Great Falls, S. C., to inspect one of the large Hydro-Electric Power Plants of the Southern Power Company. Compliments of Southern Power Company. Trains leave Charlotte about 9:00 A. M., and return about 5:00 P. M.

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## TIMELY SUGGESTIONS FOR DISCUSSION AT THE CONVENTION.

EDITOR OF COTTON: I regard the Cotton Manufacturers' Association as an important factor in the general business of cotton manufacture. There can be very little doubt that this helped to bring about uniformity of action amongst the manufacturers. This has been chiefly by the influence of social intercourse and of business expressions in connection with such intercourse, and in papers and addresses made before the Association. It transpires that in certain ways forces must be in some way mobilized to take care of the general situation, which is the business of no one person or corporation. It seems to me that at the present moment we are in need of some general mobilizing influence upon several points.

First and foremost, the mills should have some effective way of checking production when the market reaches a condition that it will not take the entire production. This is exceedingly important, and upon it depends not only profitable manufacture, but the price of cotton for the benefit of the farmer. If more goods are offered than the market will take, the natural tendency is not only to cut out all profit in the manufacture first, then the influence is to cut down the price of cotton. Both of these are very baneful influences.

It is often said that cotton manufacturers can't be depended upon to keep agreements. If agreements could be formulated not in restraint to trade, nor conspiracy to put up the price of goods, but only to create some methods of marketing goods that would not depress the price, it would be very advantageous. The English cotton spinner has reached the point where he can curtail production; surely we might reach the same point, and we certainly will have to in time. The fruit growers of California have reached a situation in which they offer what fruit is required in any market, and no more. Thus the market is always supplied with fresh fruit, so that there never is a dearth, and there is never in any market excess fruit to force the dealer to offer bad fruit on the market. If the English cotton spinner and the California fruit grower can reach agreements to steady markets, surely the American cotton spinner and weaver ought to be able to do the same thing.

The cotton manufacturer might, also, with great advantage, have some method of uniform reports upon prescribed forms, and an independent statement of the value of the stock of cotton mills. If all cotton mills could be audited by a representative of the Association and the condition of each company made public, it would advance the credit of all the mills so audited and published, and it would also advance the price at which the stock would sell.

There is always apprehension about cotton mill stock, that the statement as put out by the mill is not a correct one. It is recognized that in most cases the error is not intentional, but between intentional and unintentional errors and unverified accounts all cotton mill stocks sell very much below their value. I think the Association might well undertake some sort of regulation in both of these lines.

Yours very truly,

D. A. Tompkins.

## Ginning, Baling and Handling Cotton.

Editor of Cotton: I am informed that at the coming meeting of the American Cotton Manufacturers Association, to be held at Charlotte, N. C., May 17th and 18th, a paper will be read on the subject of "Excess Tare On Cotton," and that in the discussion to follow the whole question of the better ginning, baling and handling of cotton will be fully gone into. There is no question at the present time which is exciting more comment and interest among spinners, both in this country and in Europe, than that of the more economic handling of American cotton.

Spinners recognize fully the enormous waste and high fixed charges which apply to the present wasteful and extravagant methods of handling raw cotton in this country. At present prices for raw cotton the question of fixed charges in handling, transportation, insurance, waste, stealage and storage are items of very serious importance to spinners all over the world. Whatever economies that could be enforced in this department of the cotton industry, would be decided advantages to both the cotton growers and the spinners.

The various spinners' associations in this country and in Europe have definitely agreed that the primitive, wasteful and extravagant methods now employed in handling the American cotton crop can not and will not be corrected, except through the medium of gin-compression, where the bales can be prepared for transportation and shipment direct to the mills. The much vexed question of excess tare will never be remedied except through gin compression and the sale of cotton by net weight at the initial point of shipment. The adjustment of tare to a minimum basis, freight charges, waste in sampling, country damage, stealage, insurance and storage rates, are all matters of expense, which can only be worked out upon an economic basis through the general adoption of gin compression. If through this introduction of modern economics in the handling of American cotton the cost per pound could be reduced even half a cent, it would mean a tremendous saving under existing conditions.

The cotton growers everywhere are advocating and endorsing gin compression because it means a saving to them, in the first place, and enables them to deliver to the spinners a high class commercial package in the second. The transportation companies are recognizing the economic advantages of gin compressed cotton, because it enables the railroad companies to secure from 60 to 300 per cent. more tonnage in cars at the initial point of loading, than under the present system, to say nothing of vexatious losses from continuous checking in and out of cotton at the big compress plants.

In many respects Southern spinners are as vitally interested in this question as the New England and European spinners, though the further our cotton has to be transported the worse its condition on arrival. The matter of excess tare, high storage, country damage, waste and insurance, however, apply locally as well as for foreign shipments. There is certainly no question which should receive greater attention at the coming Charlotte meeting than that of securing improved and economic methods in ginning, baling and handling of raw cotton in this country. Inventive ingenuity has at last made it easily within the reach of Southern ginners to bring about the reform in baling which is so badly needed by equipping their gin plants with modern gin compresses of the square bale type, securing a density of 30 pounds to the cubic foot in a 500 pound bale and reducing the tare to 12 pounds to the bale.

I trust that your valued Journal will use its influence in calling special attention to this much needed reform.

Yours truly,

Harvie Jordan.

## Getting Together at Conventions.

When President Aug. W. Smith of Union-Buffalo Mills Co., Union S. C., was asked to give his views on the benefits and advantages of associations in the textile field he wrote us as follows:

Editor of Cotton: With reference to the benefit of the American Manufacturers' Association to the industry, I think an Association like this is always of great benefit in exchanging views at the meetings, and in keeping up with all live subjects concerning manufacturing. We get together with not only the manufacturers, but with those that sell us the machinery, and sell us the cotton, and buy our products, and we can get closer together and understand each other better. I think the greatest business before the Association to-day is the uniform sale notes, and also matters concerning the cotton contracts of the Exchanges.

Yours very truly,

Aug. W. Smith.

## What Is the Matter With the Cotton Industry?

Editor of Cotton: I only wish I could be present at the Convention to meet our members and hear the papers—also join in the discussions. To my mind we could all say something on the following subjects, which are now uppermost in our minds, and I offer them for consideration:

1. What is the matter with our cotton yarn industry?
2. What are the causes of our present stagnation and unprofitable business?
3. Can any one see any improvement coming for the balance of this year?

Yours respectfully,

Arnold B. Sanford,

Pres. American Cotton Yarn Exchange.

## Discuss Ginning and Baling Cotton.

Editor of Cotton: I know of no more vital subject to be discussed by the Convention than the ginning and baling of cotton. Compare the progress that has been made in the spinning machinery with the small progress made in the preparing of cotton for the market. If a percentage of the brains and thought that have been used in developing cotton spinning machinery had been used for developing machines for ginning and baling cotton, it would mean

millions of dollars saved to the spinners each year in loss in waste. I don't know of any more important subject to be discussed. Yours truly,

GARNETT ANDREWS.

## MEETING OF MILL MEN.

An informal meeting of cotton mill men representing about seventy-five mills of North Carolina was held in Greensboro, N. C., on April 19th, for the purpose of discussing and formulating a curtailment agreement for both yarn and weaving mills. The resolutions passed call upon all of the mills in the South to co-operate by putting into effect a one-third curtailment program between May 1st and September 1st of this year, with a total cessation of night work during that period.

Hon. J. A. Long, Rocksboro, N. C., was chosen chairman, and Lynn B. Williams, Burlington, N. C., secretary. The meeting was very harmonious, and all seemed impressed with the seriousness of the situation and the necessity for concerted action. Following the adoption of the resolutions which are given below, an advisory committee was appointed as follows: J. R. Tolar, Fayetteville; Ashley Horn, Clayton; M. C. Winston, Selma, and E. H. Williamson, Fayetteville, as secretary of the committee. The committee was instructed to use its best efforts to put into effect as far as possible the aims and purposes of the meeting. The committee was instructed to send a copy of the resolutions to all Southern textile manufacturers with the request that they co-operate and report their decision to C. B. Bryant, Charlotte, N. C., Secretary of the American Cotton Manufacturers Association. It is stated that if the mills will live up to the resolution as adopted, it will serve the purpose of securing an equalization of prices of the manufactured product and of the cost of production. The resolution adopted is as follows:

"Whereas, the conditions in the cotton goods trade are such that a large majority of manufacturers can run their plants only at a loss, the production of cotton goods being beyond the consumptive possibilities of the country at present cost of raw material, and whereas the only remedy and hope for the betterment in conditions is more drastic curtailment than is now in force:

First.—Resolved, by the cotton mills represented in this meeting, that in the general interest of all the mills and the manufacturing business that we curtail existing contracts, excepting the normal output of yarns and cloths of each mill between May 1 and September 1 next at least one-third, and that we call upon all cotton mills in the South to do likewise.

Second.—Resolved, that we deprecate night work and will not engage in it during this period. That we believe one of the greatest detriments to the general prosperity of the business is night work, and that this should be the first thing stopped in curtailment, that we make a special plea to all mills working nights to stop night work immediately or within a period of not later than 30 days hence.

Third.—Resolved, that it is our firm conviction that unless we do greatly reduce our production until such time as the distributers of our products can sell them at some profit to the manufacturer, and that if we continue to manufacture goods beyond consumptive requirements, which are unsaleable except at a loss, and even then to limited extent, that we shall go into next season so heavily handicapped by an accumulation of unsold goods that we can not reasonably hope for any betterment of our condition or prospects for a long time to come.

Fourth.—Resolved, that commission merchants and sales agents be requested to co-operate with the manufacturers in trying to meet existing grave conditions and that they furnish to all manufacturerers as accurate reports as possible covering stocks of all kinds, advising their correspondents of the probable demand for the next four months. We also ask that they discourage the sale of any goods for less than cost.

Fifth.—Resolved, that we earnestly invite all cotton manufacturing associations to unite in an effort to end the depression in prices by adopting plans that will fit the supply to the demand.

Sixth.—Resolved, that all sales agents be requested to join in an effort to find increasing foreign outlets from the cotton products of this country.

Seventh.—Resolved, that owing to a normal production exceeding present consumption of cotton goods, the urgent need of American cotton manufacturers to-day is broader markets. We, therefore, earnestly request all cotton manufacturers and cotton manufacturers associations in the United States to join us in memorializing Congress to use every legitimate means in their power to aid us in securing such markets.

Eighth.—Resolved, that a corresponding secretary be appointed by this meeting, whose duty it shall be to have the actions of this meeting printed and mailed to every cotton manufacturer in the South, also to the various secretaries of existing cotton manufacturers associations, and to the press, and that this convention furnish the necessary funds to defray the expenses to be incurred by the corresponding secretary, and that an advisory board of them be appointed to act with said secretary to carry out the purposes of this meeting.

Ninth.—Resolved, that the secretary in mailing his reports to mills, request all those who will co-operate in this curtailment movement to send their names to Secretary C. B. Bryant, of the American Cotton Manufacturers Association, Charlotte, N. C., as early as possible, and that Mr. Bryant be asked to co-operate with us in securing all the information possible as to the extent of curtailment.

Tenth.—Resolved, that this meeting extend thanks to the Merchants and Manufacturers Club of Greensboro for the use of their assembly room and for other courtesies extended during our stay in Greensboro.

## TAX ON ALL COTTON GROWN IN RUSSIA.

The proposed law, imposing a tax of seven-tenths of a cent per pound on all cotton grown in Russia and its central Asia dependencies of Khiva and Bukhara, has been approved by the council of ministers and submitted to Parliament for action. The measure is demanded by the cotton growers themselves and supported by the bourse committees of Khokan and Moscow, respective centers of cotton growing and manufacturing, which foresee a fight for existence between the industry and the locust plague during the coming years.

Last year 250,000 acres in the so-called "hunger steppe" in Frighana on the borders of the cotton-raising region, were devastated by grasshoppers and the invasion of the cotton regions is expected this spring.

# Child Labor in the South, and Some of its Misrepresentations.

*(Contributed exclusively to* COTTON.)

BY THOMAS R. DAWLEY, JR., FORMER SPECIAL AGENT, BUREAU OF LABOR, WASHINGTON, D. C.

LIFE OF THE CHILDREN IN THE MILL AND IN THE MILL VILLAGE. ACTUAL CONDITIONS FOUND ON THE ISOLATED FARMS, THE FORMER HABITATIONS OF SOUTHERN MILL WORKERS.

When I was assigned to the investigation of woman and child labor by the Bureau of Labor, at Washington, D. C., I was instructed to read up on the subject at the Congressional Library, where I found without difficulty many articles on the subject by professional writers, sociologists, and even ministers of the Gospel, all of which tended to show that the employment of children in cotton mills in the South was an evil that should be abolished by legislation. Small children were represented as marching in daily procession into the yawning mills or factories where they were obliged to work during the long hours of a man's working day. They represented the families at the mills as being drawn from productive farms, through the misrepresentations of labor agents; and once at the mills, these families were kept in a state bordering upon peonage by the meagre wages paid them, so that they were scarcely ever

THOMAS R. DAWLEY, JR.

able to return to the farms from which they came. They stated that the children of these families were deprived of an education, that the ceaseless toil stunted their growth, that the breathing of the lint and the foul atmosphere in the mill affected their lungs, and that they were eventually rendered physical wrecks.

At that time I had no reason to discredit these statements, and I began my work of investigating child labor and mill conditions in the South, believing that some such conditions in all probability did exist. I was given as my special topic for investigation the condition of the families on the farms before they go to the mills, and I was informed that the majority of these families were drawn from the Southern Appalachians, or the mountains extending through North and South Carolina, Tennessee, Georgia and Alabama. I was instructed to commence my work at a certain mill in these mountains, where I would find the worst condition of child labor and where the labor was all drawn direct from the farms. I was also told that the mills employing the children were in the habit of hiding children so employed from the view of the investigators who occasionally appeared at the mills and asked permission to go through them.

Thus fully fore-warned I made my visit to the first cotton mill, determined that the officials of the mill should not get the best of me and hide the children away, or send them up in the tower, as it was said they sometimes did, where I could not see them. Instead of announcing myself to the mill authorities as a government agent, I found the watchman, and after a few moments conversation with him I told him I was a stranger in those parts,

A HOME IN THE MOUNTAINS.

that I had never been in a cotton mill, which was true, and I should like to see how they made cotton cloth. He kindly condescended to take me through the mill. We first went into the spinning room, and there I saw three or four boys seated on the floor playing. I asked the watchman if those boys were employed in the mill, and if so what were their duties. He stated that they were doffer boys, and that they were required to work about one-quarter of the time. The rest of their time they spent in playing, as there was nothing else for them to do.

At the spinning frames I saw a number of girls, several of them very small girls. They were standing around; some were sitting on the window sills, and two or three were piecing up ends at the frames. The watchman explained that these girls were spinners, and that they had to keep the ends up, that is, when a thread broke they had to twist the end of the yarn to the roving leaving the front roll of the machine. The machine did the rest. The work was evidently easy and the girls were not overworked.

From the spinning room I passed into other departments of the mill where I saw no children employed. The watchman then took me into the weaving room, and there I saw one boy. I asked the watchman what that boy was doing there, and he replied that he did not know, but he

A Family and Their Residence in the Mountains as They Are Before Going to the Cotton Mills. Ten People Live in This House Without Any Sanitary Conveniences, Out House, Barn, or Shed. The House Has, However, More Than One Room. I Have Found Many Families Living in Such Houses of Only One Room.

Operative's Cottage of Dwight Mfg. Co., Alabama City, Ala. Rent $5.00 Per Month.

thought that he was helping some of his folks. I looked around for the flying lint, which was said to exist so extensively in the cotton mills, but if there was any lint in the atmosphere of that mill, it was imperceptible to me, nor did I discover the foul atmosphere, I had read about. As I left the mill I began to think that if that was a fair specimen of a cotton mill and child labor therein, somebody had lied.

A short distance from the mill I discovered a building with a sign over the door announcing that it was a club. Going into this building I found about a dozen old looking women, evidently trying to sew. With them was a young woman of genteel appearance, evidently acting as their instructor. She greeted me pleasantly and informed me that she was a social worker employed by the mill corporation, and that the group of old women were mothers of the mill children and she was teaching them to sew. I expressed my astonishment at mothers having to be taught to sew, and I asked her where they came from. She replied that they came from the farms. She then told me of other work along similar lines, which was being done for the welfare of the mill people, and paid for by the mill corporation.

She conducted me into a large hall where there were two kindergarten classes in charge of two teachers in full swing. Little tots were dancing merrily around in a circle, singing childish songs, being guided by their teachers. She said that most of these children belong to the mothers whom she was teaching to sew. She explained further that when her time was not taken up with teaching her various classes of both old and young women, she was re-

A Tenant Farmer's Cabin and Blacksmith Shop in North Carolina. This Man Was Rated As a Prosperous Tenant, As He Had Money Saved And Which He Kept in an Old Stocking.

A Farm Near The Top of A Mountain. This Man Had A Barn, and the Little Structure in the Center of the Picture is His Corn Crib.

quired to visit the families in the community who needed her help, and to look after their physical, moral and material welfare. At night she said there were various classes for teaching those who were employed in the mills during the day, held in the same building.

That night I went alone down into the mill community for the purpose of visiting the night school. Here, the first thing that attracted my attention was an automobile in front of the building. Going up stairs I saw a clean-cut young man teaching a class in arithmetic. He at once came up to me and introduced himself as the secretary and treasurer of the mill corporation. He informed me that he devoted one night a week to teaching his mill boys, and as an inducement to get them to come to his class in arithmetic he read stories to them after their arithmetic lesson was over. He then introduced me to the janitor of the building, whom he asked to show me around while he went on with his class. The janitor showed me bath rooms, reading rooms, library, lecture hall and other rooms provided for games and study, all of which were provided for the mill employees at the expense of the mill corporation. Thus, I commenced my investigation of child labor in the Southern cotton mills.

IN THE HOMES OF THE MILL PEOPLE.

Interested in the little urchin whom I had seen seated on one of the looms in the weave room, I hunted up his home, and eventually found the mother and her brood of children there. The little fellow whom I had seen at the

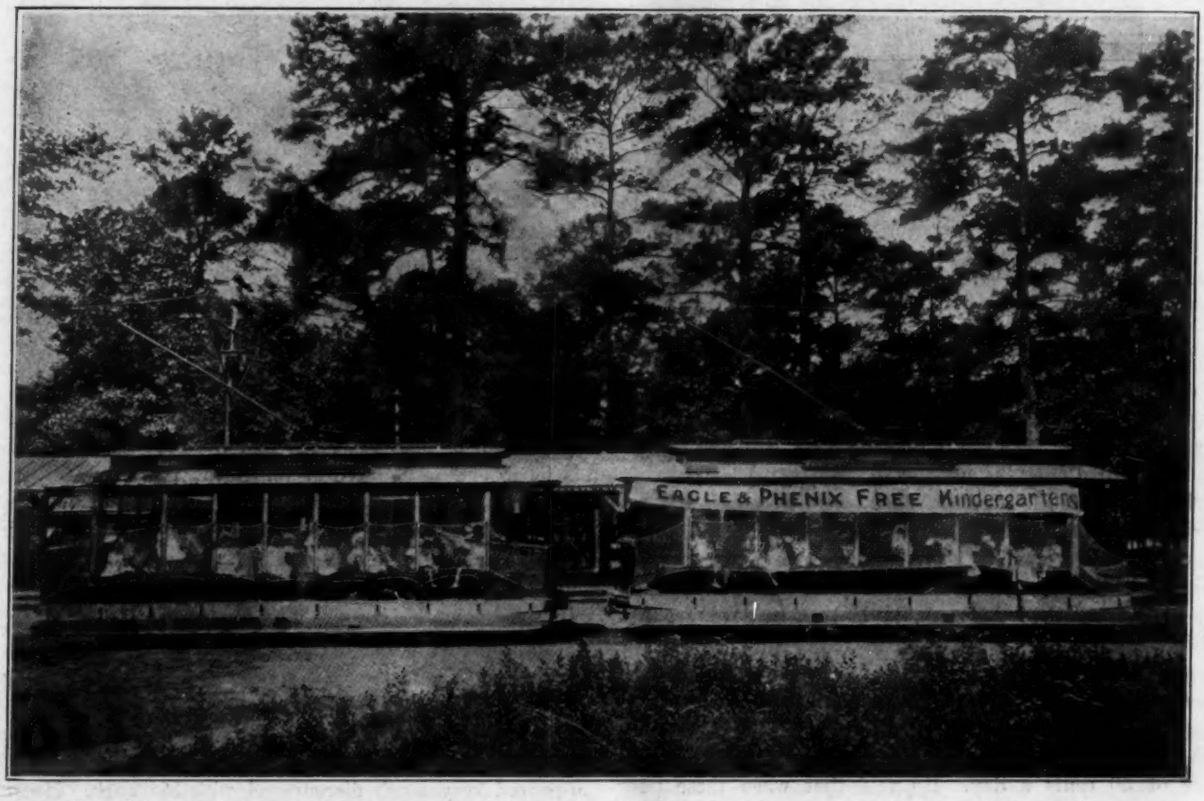
A Mountain Family Before Going to the Mill. All the Children of This Family Chew Tobacco and Eat Dirt.

mill was at home too. He was chewing tobacco and spitting tobacco juice like a grown man. His mother said he was sixteen years old, and to prove her statement to me she lined all of her children up in a row, and gave me their ages from the youngest tot up, proving conclusively that the little fellow was the age she said he was. Asking her what made him so small she replied that she guessed he

Proximity Cotton Mill School in Line for March in Educational Parade, Greensboro, N. C., Nov. 5, 1909. In Competition With All of the Public Schools of the City of Greensboro and the Rural Schools of Guilford County, Numbering According to the Newspapers About 10,000 School Children, This School was Awarded First Prize for the Best Appearance in Line of March, By a Committee of Judges Composed Entirely of Ladies and Gentlemen of the City.

took after his grandfather, who was also a very small man. She informed me that she was born and reared on a farm, that her husband drank whisky almost all of his life, that they had had a very hard time making both ends meet on the farm, and had finally come to the cotton mills where she and her husband had obtained employment. Her husband had subsequently been sent to the chaingang for killing a man in a drunken brawl. When asked if she preferred a farm to the mill she replied that perhaps she would prefer the farm if she were only fortunate enough to own it, but as she "did not own no farm," she thought the cotton mills "was the best place for poor folks."

Another family whom I visited in this community, a




Free Kindergarten Classes from Eagle & Phenix Mills, Columbus, Ga., Off for a Trolley Ride.

picture of which remains vividly depicted on my mind, was one consisting of a father, mother and six children. I found the mother disheveled, sitting disconsolately by a grate fire, occasionally spitting tobacco juice into it. She did not seem to know exactly how old she was, nor how long she had been married. She could not read nor write, and had never been to school a day in her life. She said the family had moved from the farm to the mill four years previous to my visit, and while I was talking to her, her two oldest daughters came in. They were bright tidy girls, neatly dressed and intelligent. They answered my questions without hesitation, knew precisely their own ages, and they said they had been working in the mill ever since they left the farm. They were fourteen and fifteen years of age respectively, had never gone to school a day in their lives while on the farm, but now they both could read and write. When asked how they had learned, they said they had learned at the mill. The contrast between these young girls who had commenced working in the cotton mills, one at the age of ten and the other at the age of eleven, and the old woman seated by the fire, was most marked, and as I studied the contrast, it was evident to my mind that if these two girls had remained on the farm they would have undoubtedly grown up to be just like the mother; slothful, ignorant, and tobacco chewing.

In this particular mill village I visited family after family. They all, or nearly all of them said they had come from the farm. The old fathers and mothers usually expressed a preference for the farm if—and there was always that if—they only owned a farm. But with the children I could not find one who wanted to go back to the farm. The reason given was that they had to work too hard on the farm. Girls told me that on the farms they had to hoe corn, pull fodder and even plough, but at the mill the work was easy; they could dress up, go out and see things, while on the farm they saw nothing and learned nothing at all.

On one occasion I visited a family which had evidently seen better days. The mother was neat in appearance and her home was well kept. Her two daughters were at home, and they were neat and ladylike. While the mother longed to go back to the farm the two girls shook their heads. No farm for them, and as the mother stated that she considered the farm the best place to rear children, one of the girls spoke up, and said, "Why mamma, you know that when I hoed corn on the farm half a day, I was sick for two days." Turning to me, she said, "Why, I had rather work in a cotton mill from sunrise to sunset than to have to go back to the farm again." Naturally I wondered what kind of a farm there could be where girls had to hoe corn, pull fodder, and sometimes plough, while their mothers evidently in the majority of cases, went about dirty and ragged, and chewed tobacco or snuff.

MY VISIT TO THE FARMS.

As my particular assignment was to study the condition of the families on the farm, I went from the mill to the farm. My first visit to a farm was a dozen miles from a railroad, for I wanted to get the true conditions, and I had learned that the farther I went from a railroad the better. My first farmer kept a country cross-road store, and post-office. He was a little old fellow, the father of a dozen children, all of whom he had sent away at different times to be educated, excepting the youngest who were still at home. The older ones having received their education, would not return to stay. He invited me into his house to dinner, where I was given a meal consisting of hot soda biscuit, fried fat pork, eggs, potatoes, and six varieties of home-made preserves, which was a good enough dinner for any one. I asked this farmer if any of his neighbors ever went to the cotton mills, and he informed me that several of his tenants had gone. He frankly admitted that these tenants were very poor people, that they scarcely ever raised more than enough corn to carry them through the winter, that their children were poorly clad and badly fed, and that the only work to be had on the farms in that locality was an occasional job at the rate of 50 cents a day. He said that when these poor families went to the cotton mills they undoubtedly earned more, especially as the children in most cases could work and earn fully as much per day as their fathers could at home.

I did not find all the farmers whom I visited as frank and out spoken as this one. Others told me that they did not believe that the condition of the families going from the farms to the mills was improved. They said that the cotton mills were unhealthy, that the atmosphere in them was foul and full of lint. When I asked them how they knew this, they said they had read about the cotton mills and child labor therein in the newspapers. This was the usual story I obtained from farmers who did not want to lose their tenants, and who believed that the conditions described did really exist at the mills. But my first farmer said he had become convinced that the poor people leaving his locality were bettered at the cotton mills, for he knew of several families who were at the mills, and they had reported to their friends who remained behind, that they were doing finely, and occasionally the head of one of these families would return on a visit, and make quite a splurge among his friends and relatives.

In the neighborhood of my first farmer, I visited a Presbyterian minister and missionary worker. He said that the Home Board of Missions had been carrying on their mission work in that locality for some twelve years. He was from New York, and while he did not say so, he appeared very much discouraged with his work. He said that the farmer from whom I had obtained my dinner, owned nearly all the land in the country around, and he

THE SCHOOL AT THE PELZER MILLS. THESE PUPILS ARE ALL, OR VERY NEARLY ALL, CHILDREN OF FAMILIES FROM MOUNTAIN FARMS.

THIS HOUSE COST $9.25, AND A FAMILY OF 13 PEOPLE LIVE IN IT.

TYPE OF OPERATIVE'S COTTAGE OF DWIGHT MFG. CO., ALABAMA CITY, ALA., WHICH RENTS FOR $5.00 PER MONTH.

estimated that at least two-thirds of the population in that locality were renters. He said they were a class of people who moved a good deal, looking for better land to rent, or cultivate on better conditions, but that they scarcely ever went very far from the locality, unless drawn to the cotton mills. He said that the majority of these people lived in single-room cabins, and usually reared large families of children in them. He had seen them going about thinly clad during the winter with the thermometer fourteen degrees above zero, and their only food consisted of corn bread baked in the fire place, and fat hog meat, supplemented with black coffee without sugar.

A MOUNTAIN CABIN IN THE "DARK CORNER" NEAR THE TOP OF A MOUNTAIN.

He said they were subject to such fatal diseases as consumption, typhoid fever and pneumonia, and that the nearest doctor to the locality was twelve miles way. He stated further that the children married at a very young age; that he knew a girl only thirteen years of age who was married to a boy sixteen, and that they were now both physical wrecks. He complained of the difficulty he had in getting the children of these people to attend school, for the parents did not care whether their children went to school or not, and when his teachers succeeded in getting

CHILDREN'S GARDEN UNDER THE DIRECTION OF THE WELFARE DEPARTMENT, PROXIMITY AND WHITE OAK COTTON MILLS, GREENSBORO, N. C.

some of the children into their school, and possibly getting them interested in their studies, the parents would keep them home to hoe corn in the spring of the year, and pull fodder later on, or take care of the babies or do something else around their cabins.

Not satisfied with what I was told, I determined to go among these poor people themselves, and see for myself just how they live, but this I found to be a very difficult matter. They did not live as a rule, on the high ways and roads most frequently traveled, and as I always found some well-to-do farmer at whose house I stopped for the night, I began to believe that there were not as many of the poor tenant class of farmers as the Presbyterian minister had estimated. And then I found that the majority of the well-to-do farmers and land owners would not tell me about them.

Well, I remember my experience on one occasion at one of the mountain country seats. It was one of the prettiest mountain villages which I encountered in my travels, situated upon the banks of a beautiful river flowing away into Tennessee and down into the valley of the Mississippi. All was quiet and blissful in that little town, breathing of absolute rest and repose. The well-fed proprietor of its little hotel stood in the shade of one of the trees lining

FREE KINDERGARTEN OF THE EAGLE & PHENIX MILLS, COLUMBUS, GA., FOR MILL CHILDREN.

"DINNER TOTERS" AT A COTTON MILL. THESE CHILDREN WERE REDRAWN FOR A NORTHERN PUBLICATION, MADE TO LOOK THIN, AND HALF STARVED, AND THEY WERE REPORTED AS WORKING IN THE MILLS.

the street, curious to know my business. When I told him I was studying the condition of the poor people on their farms, he drew himself up proudly as he said, "We have no poor people in this part of the country; they all get enough to eat, have enough clothing to wear, and what more do they want? They are prosperous."

As he spoke, a vivid example of the class of people whom he would have me believe had plenty to eat, enough clothing to wear, and were prosperous, passed along the street. It consisted of two men, a child, a boy and a baby, and two women. The two men led the procession, one of them carrying the child. They were gaunt, hungry looking and furrowed. She carried dangling from her waist, a frying pan, a coffee pot, and a tin cup, while in her apron, rolled up and tied around her waist, were a few other articles of her household effects.

This was a typical nomadic family of the mountains. They were moving. They had all their earthly possessions with them, and as I had been told, when they wanted to move, all they did was "to put out the fire and call the dog." I immediately started inquiries concerning this family and was rewarded by finding a man who was reared in the same locality with them, but who had pulled himself out from the midst of the poverty in which he was born and had become a "merchant." He said that when he was a boy an old man by the name of Mingus owned pretty much all the land where he lived, and a string of log cabins on the creek, which bore his name. In these cabins the poor people of the country lived as tenants of "old man Mingus" on the condition that they would pay one-third of all the corn they harvested for rent. Among these cabin dwellers there was a family or rather a number of families by the name of Mathis, who were poorer and lazier than all the others. They would never harvest enough corn to do them through the winter; they would not work, but would lie around their cabins until one of their dogs chased a ground hog into his hole, and then they would all turn out and dig after that ground hog until they got him. To get a ground hog they would dig all day long, but you might offer them a dollar a day for work and they would spurn the offer.

The merchant said he remembered one occasion when his widowed mother, having gotten behind with her crop, gave a party. The party consisted of getting her neighbors to harvest her crop, have a good time in general,

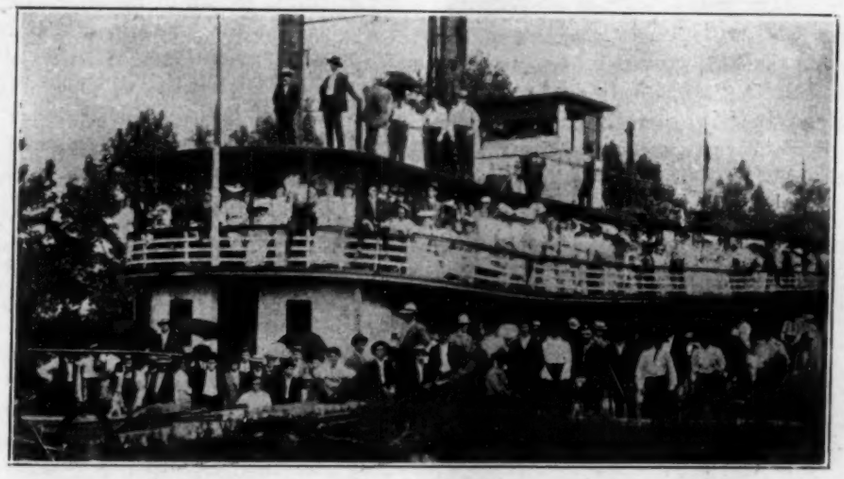
ROAD MACHINE AT WORK AT WHITE OAK COTTON MILL VILLAGE, GREENSBORO, N. C. A FORCE OF MEN IS KEPT CONSTANTLY EMPLOYED GRADING STREETS AND SIDEWALKS, CLEANING DITCHES AND KEEPING THE VILLAGE IN REPAIR.

men, and one of them carried a long gun in addition to the child, while the other carried a gunny sack half filled with plunder of some sort, across his shoulder, and led a lean hound tied to a string. The boy with the baby followed, an awkward looking, long-legged fellow with thin trousers reaching half way down his bare legs. He was barefooted, without a coat, and with only a piece of a hat on his head. Bringing up the rear were the two women, one an old, sharp featured, wrinkled character, hobbling along with the aid of a staff, and the other, though a much younger woman, had a face prematurely wrinkled and finish up by having something to eat. Among the neighbors who came to this party were some of the Mathises, and he could remember how it was remarked at the time, that these Mathises worked harder and more persistently than any of the others. The merchant dwelt upon this remarkable fact, that while it was said that no one by the name of Mathis was ever known to work either for wages or for themselves, they did work most industriously for his widowed mother, whether for the dinner she prepared for them or from a desire to help her, he could not say. However, he said they were a whole-souled, kind-

hearted people, always willing to help others but never having any serious thought for themselves.

One of their traits was their nomadic tendencies. They moved their place of abode frequently. It might be that they would have a grievance against the land owner or a falling out with their neighbor, and then they would move. They did not fight or quarrel, but upon becoming dissatisfied or discontented at anything or with anything in the neighborhood, they would "put out the fire, call the dog, and go away." It was one of these families of Mathises whom we had seen moving through the slumbering little town with its water-power undeveloped, and no factory chimney to mar the beauty of its landscape. I made friends and won the confidence of the few people there, and they told me of large families of children who never saw the inside of a church or school house, and whose only subsistence was the little corn they managed to raise near their cabins, and salted hog meat. They dug ginseng roots in the surrounding woods which they brought to town and sold to the merchants in exchange for tobacco and coffee. I was told of one family living quite near the town, consisting of father, mother and sixteen children, all living in a single room log cabin where they did their cooking, sleeping and eating. The members of this entire family were much below the average size in stature, and were known as the "little people." They wore the flimsiest kind of clothing both in summer and winter, and none of them scarcely ever wore shoes.

Not satisfied with all I was told, I went among these people myself. I found them up the creeks and on the mountain tops, and even within short distances of the mountain villages and towns. Remote from the highways, I spent nights with them; I munched with them their crude corn bread, and I saw them in board shacks and unchinked log cabins in midwinter, huddled around their fires with their half-clad, shivering, hungry children, with the snow falling outside and being whirled into the cabins through the cracks by the whistling wind. I found little children as young as three years, using tobacco, and I ascertained that the tobacco appeased their hunger; that they were always hungry; that they did not know how to play; that they never went to school; and that they got, as one little fellow said to me, "Oh, so tired doing nothing." I learned that it was this class of mountain people which was occasionally drawn to the cotton mills, and not the well-to-do mountain farmer and landowner, who could set the stranger down to his well supplied table with six varieties of home-made preserves, and send his children away to be educated. He had plenty at home and there was no need of his going away to the cotton mills.



Excursion on the Coosa River, Enjoyed by Operatives of the Dwight Mfg. Co., Alabama City, Ala.

A Family of Women on the Farm. These Women Have No Living Husbands, But Several Children Each.

Again I went to the mills, and as I investigated the lives of these people at the mills with their children engaged in light work about half the time, earning money to clothe and feed themselves well, with many opportunities, not only to play, but to learn and progress, and advance themselves in this life's battle, I contrasted those conditions with their previous lines on the so-called farm and not only readily understood why the children of these people did not want to return to the farm, but I became thoroughly convinced that the child labor conditions in the cotton mills of the South, had been a series of misrepresentations from start to finish, and that instead of the cotton mills being engaged in the murder of the children as had been stated, they were truly a God-send to them.

# National Association of Cotton Manufacturers

ANNUAL MEETING IN BOSTON HIGHLY SUCCESSFUL. HIGH COST OF LIVING FREELY DISCUSSED. TECHNICAL PAPERS READ. FRANKLIN W. HOBBS, OF BOSTON, ELECTED PRESIDENT.

The annual meeting of the National Association of Cotton Manufacturers and the 88th successive opened in Talbot Hall, Mechanics Building, shortly after 10 o'clock on Wednesday, April 27th. It was the largest and most representative gathering of recent years, fully 425 being present, when President Charles T. Plunkett, of Adams, Mass., called the convention to order. The first business was the appointment of a committee to select nominees for the offices of president, two vice-presidents and three members of the board of directors, to be balloted on the following day. The following committee was appointed by the President: Edward W. Thomas, Lowell, Mass.; George W. Bean, Lewiston, Me.; Harry W. Butterworth, Philadelphia; Arthur O. Dawson, Montreal; T. I. Hickman, Augusta, Ga.; Russell B. Lowe, Fitchburg, Mass.; John McManus, Chadwick, N. Y.; Charles O. Read, Pawtucket, R. I.; Arnold Shafer, Warren, R. I., and William Parker Straw, Manchester, N. H.

FRANKLIN W. HOBBS, NEWLY ELECTED PRESIDENT.

Dr. C. J. H. Woodbury, Secretary and Treasurer, read his reports, which showed a membership on April 1st of 997, including 84 additions within the last year. During the year 13 members had died, 17 had resigned and 16 had been dropped from the rolls for non-payment of dues.

The committee on award for the Association medal announced the decision of the committee to award the medal to Dr. C. J. H. Woodbury, the Secretary, for his paper on "Bibliography of Cotton Manufacture," the second installment of which was presented by Dr. Woodbury at the afternoon session of the second day. Dr. Woodbury is a graduate of the Massachusetts Institute of Technology, an honorary master of arts of Tufts College, honorary doctor of science of Dartmouth and Union colleges, a holder of the medal of the Societe Industrelle de Mulhouse, also the John Scott medal of Philadelphia and is a member of several engineering and scientific societies.

The award committee consisted of: William D. Hartshorne, chairman; J. Herbert Sawyer, Stanley R. Latshaw Sidney B. Paine, Daniel A. Tompkins and William T. Westerman.

His Excellency, Eben S. Draper, Governor of Massachusetts, was then introduced by President Plunkett in a few well chosen words. Governor Draper welcomed the Association to the Commonwealth of Massachusetts. Franklin W. Hobbs, a Vice-President of the Association, responded to the Governor's address of welcome.

President Plunkett then delivered his annual address, reviewing the work of the Association and of the cotton industry during the past several months. Richard C. MacLaurin, Sc.D., President of the Massachusetts Institute of Technology, delivered an address to the Association.

Howard Ayres, Secretary of the Cotton Export Association, concluded the first session with a paper on "Certain Aspects of the Cotton Export Trade."

SECOND SESSION.

WEDNESDAY, APRIL 27, 1910, AT 2 P. M.

Business.

"Progress of the Diesel Engine," by Col. E. D. Meier. (By invitation of the Board of Government.)

"The Federal Corporation Tax Law," by Walter S. Newhouse.

Report of Committee on Standard Specifications, by Albert Farwell Bemis, Chairman.

"A Substitute for Cotton; and a New Method of Operating Ring Frames," by James Hope, Rouen, France.

"Aboriginal American Weaving," by Miss Mary Lois Kissell, American Museum of Natural History. (By invitation of the Board of Government.)

THIRD SESSION.

THURSDAY, APRIL 28, 1910, AT 10 A. M.

"Superheated Steam and Superheaters," Dr. D. S. Jacobus. (By invitation of the Board of Government.)

"Buying and Handling of Steam Coals in New England," by John S. Lawrence.

"The Electric Drive as a Manufacturing Proposition," by Meldon H. Merrill.

"Choice of Power for Textile Mills," by Charles T. Main.

FOURTH SESSION.

THURSDAY, APRIL 28, 1910, AT 2 P. M.

"Recent Advances in the Chemistry of Coal Tar Colors," by Hugo Schweitzer, Ph.D. (By invitation of the Board of Government.)

Ballot upon those proposed for membership.

"Sizing of Vegetable Fibers," by Hermann Seydel.

"Production Increasing Methods, Training Workmen," by Henry L. Gantt.

Election of Officers.

The following officers were elected for the ensuing year:

President: Franklin W. Hobbs, Boston, Mass.

Vice-Presidents: George Otis Draper, New York, N. Y.; Edwin Farnham Greene, Boston, Boston, Mass.

Directors for Three Years: Albert F. Bemis, Boston, Mass.; R. M. Miller, Jr., Charlotte, N. C.; Russell B. Lowe, Fitchburg, Mass.

Director for Two Years: Frederick A. Flather, Lowell, Mass. (To fill out the uncompleted term of Mr. Greene.)

Director for One Year: Frederick B. Macy, New Bedford, Mass. (To fill out the uncompleted term of Mr. Flather.)

"Distribution of Artificial Light," by Frank Marshall Scantlebury. (Illustrated by the stereopticon.)

"Bibliography of the Cotton Manufacture" (second paper), by C. J. H. Woodbury.

## Sketch of Franklin W. Hobbs.

The newly elected President of the National Association of Cotton Manufacturers, Franklin Warren Hobbs, was born in Roxbury (now part of Boston), Mass., September 24, 1868; son of William and Mary (Cogswell) Hobbs and grandson of William and Maria (Miller) Hobbs and Francis and Mary (Marland) Cogswell. His first ancesters in this country were Joseph Hobbs of Bristol, England, who came to Watertown, Mass., in 1685, and John Cogswell, who came from England to Ipswich, Mass., in 1635. This record is particularly interesting because Abraham Marland, the father of Mary, and great-grandfather of Mr. Hobbs, was the founder of the Marland Mfg. Co., now the Marland Mills of the M. T. Stevens & Sons Co., at North Andover, Mass. Abraham Marland testified before Congress between 1830 and 1840 on the tariff on wool which if adjusted as he desired would enable him to use the then extraordinary quantity of 40,000 pounds per year. Abraham Marland's brother, John Marland, was the first manufacturer in America to make all wool delaines. His factory was at Ballardvale, Mass.

As treasurer of the Arlington Mills of Lawrence, Mr. Hobbs refers with pride to the success of his ancesters as woolen manufacturers, and as the highest officer of the National Association of Cotton Manufacturers to the long continued presidency of the Boston & Maine R. R., by his Uncle Francis Cogswell and whose brother, William Cogswell, was long a member of Congress.

Mr. Hobbs' father was a lawyer, living at Brookline, where Mr. Hobbs graduated from the high school, and from the Massachusetts Institute of Technology S.B. 1889. He was instructor in mechanical engineering in that institute from 1889 to 1891, and in 1891 began his practical work as an engineer in the Arlington Mills. In 1902 he was elected treasurer of the corporation. In addition to being treasurer and director of the Arlington Mills and president of the National Association of Cotton Manufacturers, he is a member of the executive committee of the National Association of Wool Manufacturers, State trustee of the Lowell Textile School, chairman of the school committee of Brookline, vice-president of M. I. T. Alumni Association, trustee of Mount Auburn Cemetery, director of the Arkwright Mutual Fire Insurance Co., of the Home Market Club, of the Riverside Press, a member of the council of the Beverly Yacht Club, a member of the Eastern Yacht Club, the Union Club, the Country Club and the Brookline Republican Town Committee and many other clubs and societies. He married May 31, 1892, Jane Hallett, daughter of William and Jane (Hallett) Whitman, living with their four children at 78 Upland Road, Brookline, Mass. His office address is 78 Chauncy Street, Boston. His knowledge of the tariff question dates from his earliest connection with the Arlington Mills at that time visiting England and France for the purpose of studying the question. His report is in Senate documents on the tariff of 1892.

## PRESIDENT'S ADDRESS.

BY CHARLES T. PLUNKETT, ADAMS, MASS.

When we last met in this hall, on the occasion of the annual meeting of 1909, we bade adieu to the aftermath of a disappearing panic; took an inventory of the salvage, and optimistically entered upon a year's business having a basis of favorable expectations the splendid cotton crop of 1908, unsurpassed at any time in quality and quantity, with a fair prospect of its duplication in 1909. Then, too,

CHARLES T. PLUNKETT.

the tide of immigration had set strongly to our shores, capital was abundant in every portion of the country; labor was well employed and the market gave every promise of normal conditions.

Even though it might be truthfully said that the larger part of the year resulted in no serious disappointment in actual transactions, the outlook for more remote business

became obscure when it appeared certain that there would be an undersized and somewhat inferior crop, with the ever-present manipulation which adds its disheartening handicap to a world-wide industry whenever for natural or other causes the crops are of controllable size. The foreign spinners acted promptly in meeting the inevitable results of abnormal cost by sweeping curtailments in their consumption of cotton, commencing in July and amounting to about 2,000,000 bales to this time.

Whatever the outcome to themselves, there can be little doubt of the effect on the cotton market on this side of the Atlantic, where curtailment has been spasmotic, desultory, and ineffective.

For many centuries, mechanical ingenuity has left its monuments wherever the crying needs and pressing demands of humanity have become known, and will continue to be recorded in the volumes of history as well abreast of the greatest humanitarian agencies. It may yet transpire that mathematicallly determined acreage, scientifically prescribed balancing of crops to spindle production, shrewdly devised financing of available stocks, disconcerting quotations of fictitious sales and numberless other artificial barriers to natural law will be defeated by the tireless reinforcing army of inventive genius.

The field picker and the gin compress are notably in the front rank of recent developments of agricultural machinery as affecting textile manufactures and their employees. In event of demonstrated success of the picker, the contention that scarcity of labor will permanently prevent a considerable increase in planted area will have lost it force, and soils particularly adapted to raising cotton in varieties not now cultivated in this country may be tilled and the lint gathered by machinery where hand labor is wholly inadequate numerically. The United States Department of Agriculture, having a station in Arizona, has announced the result of a two years' experiment with Egyptian seed which satisfactorily proves to the Bureau of Plant Industry that the soil and climate are especially adaptable. Should there be substantial foundation for this report, the paucity of plantation hands will no longer be a deterrent factor to wide cultivation, and the extraordinary additions to fine yarn spinning machinery (made both here and in Europe, while staple cottons are, prospectively at least, growing scarcer) may be supplied at costs comporting with such economical manufacture of goods as will stimulate and not restrain the new uses of fine fabrics and permit freer consumption of those heretofore produced. The absorption of nearly 300,000 bales of longest and strongest stapled cottons for automobile tires illustrates how speedily a large percentage of a limited crop may at any time be diverted to novel purposes.

The Agricultural Committee of the House of Representatives has reported a singularly drastic bill applying only to cotton options (ignoring similar transactions in grains and other produce) the force of which would be to abolish hedging insurance as a basis for good contracts. By the terms of this measure, it will be unlawful to negotiate any contract for purchase and sale of future deliveries of cotton when the actual delivery and receipt is not intended in good faith. It permits the bona fide owner to sell for future delivery upon making affidavit that he will deliver the cotton when grown upon lands owned or controlled by him. The prohibition of the use of all usual mediums of communication, such as mails, telegraph, telephone, cable or wireless, will effectively prevent transactions except by virtue of accompanying affidavits, though providing that the sellers may "swear ahead" for six months, filing with transmission agents their advice omnibus oaths in lieu of the signed, sealed and sworn documents with each message. The penalty for failure to deliver or receive the actual cotton is a fine not to exceed $1,000 and imprisonment from one to six months; and such a failure is deemed prima facie evidence that the contractor originally intended to evade the law.

### STANDARD GRADES OF COTTON.

Referring to the expectation expressed at the fall meeting of this Association that the Department of Agriculture would have distributed their standardized types of grades in season for discussion at this meeting, it is only possible to say that preliminary distribution will soon be made to associations, organizations of cotton men, cotton exchanges, and agricultural colleges in the cotton states for the purpose of familiarizing the cotton trade with the official cotton types. When this distribution has been effected, a more general one among cotton dealers and producers will be undertaken. The official cotton grades have been adopted for the purposes of trade by the New Orleans Cotton Exchange, and similar action is being considered by the New York Cotton Exchange.

Each grade box contains twelve samples of cotton representing as nearly as possible the range of diversity in the grade. Inasmuch as any extraneous matter or material unevenness in the surface of the cotton is depicted in the photograph, it is evident that should the cotton be changed in appearance, that fact can be determined by comparison with the photograph. The seal of the Department of Agriculture and the signature of the Secretary, together with a seal impress certifying the grade of cotton will appear on the photograph. A series of experiments has been carried on, as a result of which it has been found possible to produce vacuum tubes each large enough to hold a single cotton sample. Twelve such tubes therefore will take care of one grade. By this means the cotton can be kept for an indefinite period of time without suffering from the effects of atmospheric or climatic changes, or from light.

### HIGH COST OF LIVING.

The frequency of attacks on corporations which are of sufficient size to be noticed by reformers in state and national capitols, and the continuous fire of stimulating publicity in the press upon the subject of high cost of living have, undoubtedly, created a widespread conviction that something must be done by some one who is not now doing it, to check the progress of upward tendencies in a large range of commodities. It is fair to assume that with unprotected cotton at from five to fifteen cents above normal prices, with goods selling at no time on a basis of one-half that advance, and at present very much less than half, our own industry at least is not open to censure, even as a contributing cause.

The tariff, with necessary revision on a few constructions—compulsory if any similar goods were to be made at all by American workmen,—has not been so changed as to affect prices of cotton goods while the disparities in labor costs are even greater than during most periods of tariff revision. It is quite clear that constant employment of bread winners in every occupation is the most practicable solution of the vexed problem with which nearly every one

is confronted. The ceaseless high cost agitation—largely political—defeats all hopes of speedy enlargements of trade, in consequence of which the continuance of employment particularly in textile establishments is not altogether encouraging. Patience is the all-important virtue in the present conflict which appears to have its foundations in meddling legislation, and to have derived its impulse from political machinations. Time alone will satisfy buyers who were made ultra conservative by the experiences of 1907 that cotton goods will not be made for a very long period at such absurdly meagre margins, if indeed serious losses are avoided, when fall contracts are made from the unknown crop.

Incomplete as this final address of your president is in other respects, it shall not be so in its expression of appreciation and admiration of the splendid achievements of appointed committees, who have devoted many hours of invaluable service, when the taking of those hours called for sacrifice of time in their business and meant to them a proportionally increased intensiveness. The stability of most associations and civic institutions is, in a large measure, determined by conscientious devotion of those who are called to assume responsibilities oft-times of inestimable importance to an industry, a state, or a nation. The members of special committees of this Association are entitled to the warmest commendation of mill officials and selling agencies, as well as of buyers and converters, whether or not on our membership rolls.

## THE SECRETARY'S REPORT.

C. J. H. WOODBURY.

The papers and other proceedings at the two meetings of the Association held during the year have been submitted to the membership in Transactions, volumes 86 and 87, which form in themselves a library treating upon a wide range of textile subjects. The Association has a card catalog containing about 25,000 cards, which is at the disposal of any members who may call for consultation, and the Secretary is always ready to furnish any citations which may be contained in these volumes. The Association does not have separate copies of these papers, and therefore can not furnish them, although there are numerous requests for such copies usually from outside of the membership, and the best that can be done to accomodate such applicants is to provide them with copies under the terms fixed by the Board of Government and stated in each volume of the Transactions.

### LIBRARY.

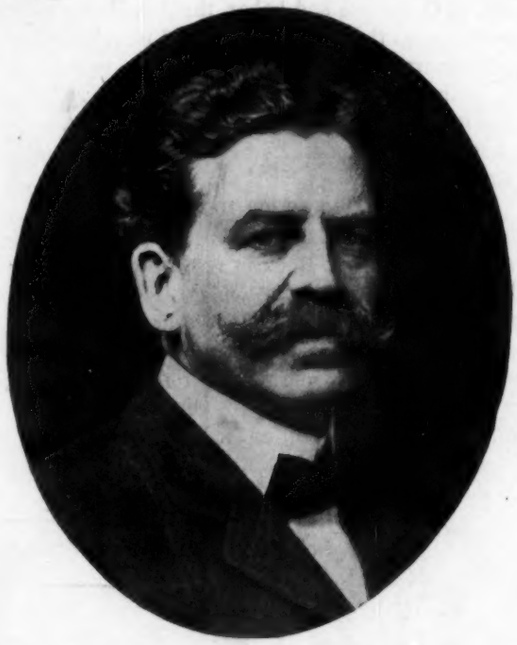
The Association has received a number of donations of books during the year, notably an elegant folio volume, in Russia on the History of the Great Yaroslavl Mfg. Co., from 1722 to 1856, from A. F. Griasnoff, a member of this Association, who is manager of this great establishment. J. Herbert Sawyer has also contributed a number of books, some of them being very rare volumes on the subject of cotton manufacturing. Henry D. Martin and William G. Nichols have given to the Association books of their own authorship in compliance with a request in a former report of the Secretary that authors among the membership should contribute to the Association library their own publications.

### UNITED STATES DEPARTMENT OF AGRICULTURE.

The work of this department in its primary function of attending to matters pertaining to the products of the soil, has in its operations relating to cotton, continued to be of great value to the manufacturers of American cotton, wherever it is spun. The work of the Commission on Standard Cotton Grades, on which this Association was represented, and in whose organization it was consulted, has been completed. The work of the department on American Egyptian cotton at its experimental station in Arizona is reported to be meeting with success in both staple and product as is stated in published reports which are available to all.

### BUREAU OF MANUFACTURES.

The Bureau of Manufactures has distributed to members, reports on Cotton Goods in the Near East, and has sent



C. J. H. WOODBURY, Secretary.

to this meeting samples of goods obtained in Abyssinia, which have been placed in the Textile Exhibition where they may be freely inspected.

### FOREST CONSERVATION.

The efforts for the conservation of forests to the extent that it should prevent the further ruthless denudation of the mountain slopes in the eastern portion of this country, both north and south, with its serious effects on water powers reaching out into both questions of agriculture and manufacturing, and to the labor which those industries preserve, will continue to be one of the great questions before the American people until it is settled, and settled justly.

This Association has kept in touch with the progress of the matter, as is indicated in the bills introduced into the House of Representatives on the subject, and it is believed that final results of a favorable nature will be obtained at the present session of Congress.

### STANDARD BILL OF LADING.

In compliance with instructions, the Secretary appeared before the House Committee on Interstate and Foreign Commerce in advocacy of a standard bill of lading in such form as to be a suitable collateral for loans by banking institutions. At the present time such advances on bills of lading are made on the credit of the person obtaining the loan.

Representatives of commercial bodies from various parts of the country appeared in advocacy of the bill, and previous to the hearings conferences were held with representatives of railroad transportation companies and amendments drawn, which waived any criticisms against the measure from that source, so that at the hearing a type of bill was advocated which had the endorsement of merchants and mercantile associations and was free from objections by transportation interests. If the bill should become enacted into a statute, it will provide that the large amount of either raw material or finished product in transit, instead of being dead capital can properly be utilized as live capital.

THE JAPANESE HONORARY COMMERCIAL COMMISSION.

At the request of the Department of State and the Department of Commerce and Labor, the Association extended such courtesies as the opportunity would permit to the Japanese Honorary Commercial Commission, which visited Boston during the last week of October, 1909, and in commemoration of their visit a bronze medal of the Association was presented to Baron Eichii Shibusawa, the Chairman of the Commission.

ASSOCIATION MEDAL.

The Association Medal for 1909 was awarded to James R. MacColl, Providence, R. I., in recognition of his work in establishing the International Conferences between growers and manufacturers of cotton. It is believed that these congresses were the only co-operative meetings ever held between the producers of a raw material and the manufacturers of a finished product. The committee awarding this medal for 1909 were: Charles H. Fish, Chairman, William A. Congdon, Henry D. Martin, Franklin D. Williams and Daniel A. Tompkins.

The recipients of this medal have been: Charles H. Fish, 1901; Sidney B. Paine, 1902; William D. Hartshorne, 1903; Daniel Moore Bates, 1904; Henry G. Kittredge, 1905; William D. Hartshorne, 1906; Charles B. Burleigh, 1907; Charles H. Fish, 1908; James R. MacColl, 1909.

THE STUDENT'S MEDALS.

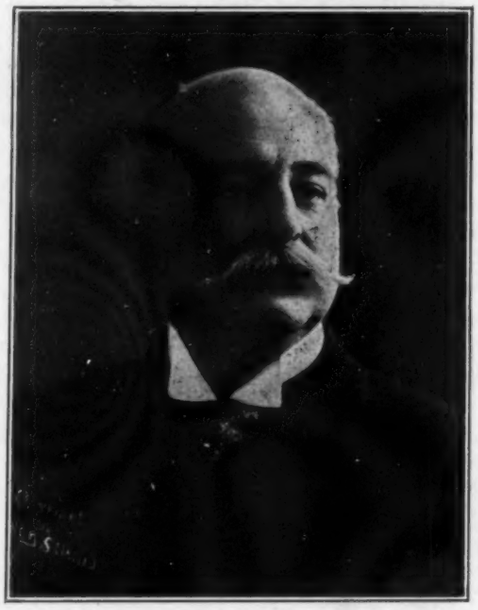
The Student's Medals for the encouragement of textile education which is supported by a fund donated for that purpose by the late Moses Pierce, Norwich, Conn., in commemoration of his ninety-second birthday, July 3, 1900, have been awarded during the year to Theodore H. Schumann, New York City, a graduate of the Philadelphia Textile School; George Gray Simpson, Norfolk, Va., a graduate of the North Carolina College of Agriculture and Mechanic Arts, and Karl Howard Potter, Ludlow, Mass., a graduate of the Lowell Textile School. The method of awarding the student's medals was changed in 1907 by vote of the Association and in place of special committees of the members appointed by the Board of Government to make the examination and then the decision, certain rules were adopted and sent to all of the known textile schools in the United States. Under these conditions, medals will be given this year at the Lowell Textile School, the Philadelphia Textile School and the North Carolina College of Agriculture and Mechanic Arts.

THE ASSOCIATION SCHOLARSHIP.

The Association Scholarship at the New Bedford Textile School, preferably for the son of a member of this Association, will become available this year on account of the graduation of the present holder of the scholarship in June, 1910, and applications in writing addressed to this Association will receive careful consideration. Applicants should give their education and experience and agree to take the full course.

MEMBERSHIP.

The Association has sustained an especial bereavement by the death of Ex-President Alfred M. Goodale, which occurred December 17, 1909, and the Board of Government at its meeting on January 25 passed the following in commemoration of his memory: "The Board of Government of The National Association of Cotton Manufacturers enters upon its records this minute in respectful commemoration to the memory of Alfred M. Goodale, a member of the Board of



GOVERNOR EBEN S. DRAPER, OF MASSACHUSETTS.

Directors, 1890 to 1893; vice-president, 1893 to 1895; and president in 1895 and 1896. His character as a man, his skill as a cotton manufacturer, and his efforts towards the improvement of the cotton industry stand as an inspiration and as an example to others."

The following members have died: Christopher P. Brooks, C. F. Curwen, Gen. William F. Draper, James G. Garland, Alfred M. Goodale, William Hayes, Robert J. Hoguet, Arthur W. Hunking, William A. Lehan, Arthur H. Mason, Edward B. Townsend, Frederick E. Waterman, and John H. Whitten, of whom memorial sketches will appear in the volume of Transactions forming a record of this meeting.

The membership, April, 1909, was 961, and the election of 84 during the year have made the membership, subject to the above reductions, on April first, 997, to which will be added in the appendix to this report the number elected at the forthcoming meeting.

MEETINGS.

The Association has held as usual two meetings during the past year, one at Boston April 29-30, 1909, and one at Bretton Woods, N. H., September 22-23, 1909.

The Board of Government has held four meetings during the year, and members have continued to favor the Association with many and useful suggestions.

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The navies and merchant ships of the world use more cotton duck to-day than was required in the days of sailing vessels.

## ADDRESS OF WELCOME.

BY GOVERNOR EBEN S. DRAPER.

I think you gentlemen know something about the law of supply and demand this year. Last year you had 13,500,000 bales of cotton, and the price was 10 to 10½ cents a pound. This year you have 10,500,000 bales of cotton and the price of the raw article is 15 cents a pound, not nearly as good and hard to get. If that is not an illustration of the law of supply and demand that you gentlemen can understand, I fail to know where there is one.

I rejoice in the courage of the cotton manufacturers, because if they had not courage they would not be building new mills to-day under existing conditions. We find the raw staple selling at this tremendously high price of 15 cents a pound or more, the quality not as good as it has been in some years, the demand for the manufactured goods not good at present, hard to sell their products; and still we see in New Bedford the greatest expenditure for the construction of new mills that has taken place in any of our great textile cities in years, great additions being made and contemplated in Lowell and Lawrence, and other sections of New England. That shows that in spite of the temporary bad conditions which are existing, the cotton manufacturers, who are not merely brave but level-headed and wise, believe that the future of the cotton industry is secure, and that business is going to be good. And as I, each year when you come here, undertake to be something of a prophet, I will prophesy now that that opinion is correct, and that that is what is going to happen, and that business is going to be good in this great industry, and I am delighted to make that prognostication. It sounds well now, and I only hope it will prove true.

I want to say to you that the Governor of Massachusetts appreciates the great textile industry in which you are engaged. It is one of the three great industries of this commonwealth, and her people depend upon it; and I appreciate its importance. I believe that it should be properly fostered and cared for by the laws of the commonwealth of Massachusetts. And while I am not the legislature, I do have some part in the making of laws in this State, and I think I realize the great importance of this industry to the commonwealth. And it gives me great personal pleasure as Governor of Massachusetts to welcome you gentlemen to the capital city of this State, and I trust that your stay will be pleasant, that your meetings will be most gratifying to you personally and helpful to the industry, and that later on you may come here again to renew your acquaintance with Boston's citizens and with the hospitality of the capital city of the commonwealth of Massachusetts.

## RELATIONSHIP OF SCIENCE TO THE TEXTILE INDUSTRY.

BY RICHARD C. MACLAURIN, SC.D., PRESIDENT MASSACHUSETTS INSTITUTE OF TECHNOLOGY.

I am glad to take part in these opening exercises of your annual meeting because the most cordial relations have existed for long between your Association and the Institute of Technology,—and long may such relations continue.

It is doubtless true that the most prominent influence in bringing about changes in the cotton industry has been the force of competition; but not even the keenest competition can produce the slightest change, unless there be a supply of men imbued with the scientific spirit to look for possible improvements and equipped with the scientific and technical skill to actually effect these improvements. To supply such men is the great service that the Institute of Technology is rendering and has rendered to industry. It has stood from the first for two great principles in education. The first principle is the insistence on science as the basis of advancement,—on sound and serious science learnt by actual experience in the laboratory rather than from books,—with special emphasis on the *method and spirit of science* applied to the practical affairs of the day. The second principle is the necessity for hard and steady work from the students,—the training of young men to the habit of *continuous application to the problem in hand,* instead of to the discursive effort that characterizes untrained minds. The "Boston Tech" (as it is familiarly called) has sent a large number of its alumni into the industry that you represent, and a large proportion of these have risen to eminence in their profession, being found as engineers, chemists, managers or owners of several of the most successful textile mills in the country.

RICHARD C. MACLAURIN, SC.D.

Your Association has a record of usefulness of which it may well be proud. I understand that one of the most effective modern methods of mill construction proceeded from a member of your Association, and that the development of that method to greater economies of material has a similar origin. Your influence has extended far beyond the boundaries of your own industry; for several modern applications of electric lighting and transmission of power were due to the demand of the Cotton Association. Perhaps most far-reaching of all has been the enlightening influence of your example in recognizing the value of free discussion, the need of co-operation, and the advantage of a general sharing in information. And there can be no question that the abandonment of the old idea of secrecy has worked well for the industry as a whole, and that it is in the general interest that improvements in machinery and in methods should spread rapidly.

It is because of this constant demand for improved means of supplying power, improved lighting, improved methods of fire prevention and fire extinction, improved spinning and weaving, improved dyeing and bleaching, and so on, that the need for properly trained men in the cotton industry becomes steadily more urgent. Under the old regime the so-called "practical" man was entirely in control. At his best he knew *how* a thing had been done for years. The technically trained man of to-day must know not only *how*, but *why;* and the main reason for his knowing *why* is that, by thoroughly understanding the process, he may be in a position to improve it or adapt it to new conditions.

If I may be permitted one word more with reference to the Institute of Technology, I should like to say that it has already done something by means of its research laboratories to promote the advancement of the great industry in which you are all vitally interested. I recognize, however, that vastly more might be done if manufacturers would more regularly refer such questions to the Institute for investigation. We have laboratories equipped for researches in mechanical, electrical, chemical and other branches of engineering. And we are ready to undertake researches at the instigation of interested parties, not as a money-making device at all, but simply to help on the development of the resources and industries of the nation. Here are evidently great possibilities for advancement; but without your hearty co-operation we can effect little for the great national industry that this association represents.

## COMMITTEE ON STANDARD SPECIFICATIONS.

BY ALBERT F. BEMIS, CHAIRMAN.

FOURTH REPORT.

To the President of the National Association of Cotton Manufacturers:

Since the autumn meeting of the Association at Bretton Woods, the efforts of your committee have been devoted largely, through co-operation with the Uniform Contract Committee of the American Cotton Manufacturers' Association, toward getting the members of the trade to recognize the proposed sale note as the standard form for use in buying and selling staple gray goods in this country.

Three meetings have been held in New York City between members of the trade interested in this matter and members of the committee of this Association and the American Cotton Manufacturers' Association. At these meetings it has been the overwhelming conviction that some form of contract that could be used as a standard would be of great benefit. Thus far, however, it has been difficult to harmonize interests that on the surface appear conflicting. It has become evident that, without the active support of buyers, it would be difficult to get any form of sale note generally adopted and in use within any short period of time. A committee of buyers has now been appointed to consider the matter, with fair prospects not only that its members will become interested in this matter but that views as to details will ultimately be harmonized as between buyers and sellers and some form of sale note recognized by the trade generally as a standard for use in gray goods transactions wherever possible. Steps to this end were taken at a meeting held in New York City on April 15.

Following the vote of this Association at its autumn meeting, enlarging the scope of this committee, its title has been changed to Committee on Standard Specifications, and Messrs. Arthur T. Bradlee, William B. Hawes and Philip Dana have been added to the committee's membership as a sub-committee to consider and report upon a standard form of sale note for yarn. Members of this sub-committee have attended one or two of the New York meetings referred to above, and have held a joint meeting with the sub-committee of the American Cotton Manufacturers' Association on yarn. The committee, however, is not ready to propose any form of sale note at present, believing that the feasibility of a sale note for yarn depends upon the outcome of the sale note for cloth.

Our yarn sub-committee, however, is not sleeping in the meantime, and, in fact, has arranged for a series of tests that, regardless of the outcome of the sale note feature, can not but prove to be of great interest and value to the trade. Through co-operation with the textile department of the Massachusetts Institute of Technology, a series of tests is being made upon yarns of various numbers and mill makes with a view to determine what the actual limits of variation in yarn are, both as to strength and number.

Your committee has the sad duty of reporting the death of one of its most interested and valuable members, Alfred M. Goodale, who died late in the evening of December 17, 1909. He was intensely interested in the work of the committee, and his assistance in bringing about what has thus far been done was invaluable. He was very earnest in advocating the adoption of such a sale note by the trade, believing that great benefit would result. He was the first to use the form commercially and reported it to be a practical success. Your committee has suffered a severe loss in the death of Alfred M. Goodale.

Your committee has good reason to hope that it will be able to make a final report on cloth at the next autumn meeting, and in the meantime asks your further indulgence and support.

## THE FEDERAL CORPORATION TAX.

BY WALTER S. NEWHOUSE, OF THE NEW YORK BAR.

The purpose of all taxation is to afford revenue for the maintenance and support of our system of government. Congress has wide powers in that regard. The only restriction laid upon it by the Constitution is that exports can not be taxed. The only qualifications are that all direct taxes must be apportioned among the States in accordance with their population, and that all indirect taxes (duties, imposts and excises) must be uniform throughout the United States. The uniformity referred to means geographical uniformity; for instance, no tax can be levied upon a corporation of New York unless a similar burden is placed upon a corporation of Massachusetts.

The title of the act itself is of interest in showing or purporting to show the intention of Congress in its enactment; it is entitled "An act to provide revenue, to equalize duties and to encourage industries of the United States *and for other purposes.*"

The purpose of the law as set forth in its terms is to impose a tax on domestic corporations with respect to *the carrying on or doing business* and upon foreign corporations on *business transacted and capital invested* within the United States. The term "foreign corporations" refers to corporations organized under the laws of foreign countries,

and as the number of corporations formed under the laws of the United States is so small as to be a negligible quantity it is apparent that the tax is directed in the main against corporations organized in the various States of the Union. The tax is to be levied upon the "net income," which forms the basis for assessment. This net income is to be computed by making certain deductions from the "gross amount of income received" by the corporation from all sources within the calendar year ending December 31st. These deductions in the case of manufacturing corporations are as follows:

1. All the ordinary and necessary expenses actually paid within the year *out of income* in the maintenance and operation of its business and properties.

2. All losses *actually sustained* within the year and not compensated by insurance or otherwise.

3. A *reasonable* allowance for depreciation of property, if any.

4. Interest actually paid within the year on its bonded or other indebtedness to an amount not exceeding *its paid-up capital stock.*

5. All sums paid within the year for taxes, both State and Federal, and those imposed by any foreign country as a condition of carrying on business therein.

6. All amounts received within the year as dividends upon stock of other corporations or associations subject to the tax imposed by this act.

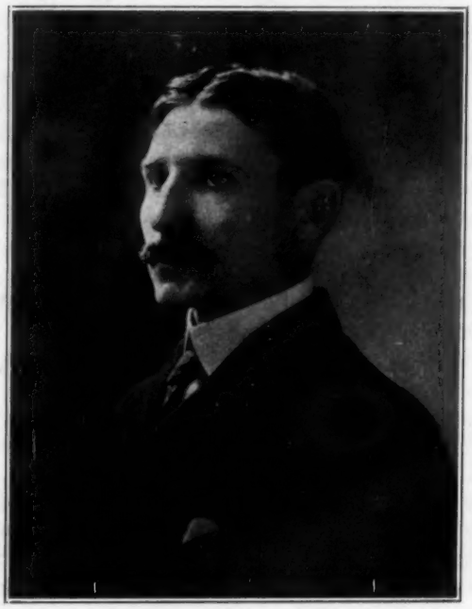
From the balance remaining after making the above deductions deduct $5,000, and the sum then remaining is the amount taxable at one per cent.

Each corporation must make a return giving all this information and forward same to the Collector of Internal Revenue of the district in which the main office of the corporation is located. After the assessments are made against the corporation, these returns constitute public records and are open to public inspection. There might possibly be a good reason in making public the return of those corporations whose stocks are dealt in on boards of exchange, and whose securities are widely held by investors throughout the country, but such a discrimination would be impracticable if not illegal. Not alone must the return of the corporation become a public record, but all information obtained by the Federal officer or employee examining the books and records of the corporation, may be made public by the president, *in his discretion.*

There appears to be a wide divergence of opinion between the various departments of the government upon what the tax is really imposed. The president and the department of justice proclaim it to be "an excise tax upon the privilege of doing business as an artificial entity" (*i. e.*, in corporate form). On the other hand, the secretary of the treasury, in his public statement upon the tax, says, "The real intent of the law is to collect a tax of one per cent. on the net income, less $5,000, of those liable to the tax."

The tax measure to be effective should be simply worded, and its meaning should be perfectly clear and easily understood, not alone by those whose duty it is to collect the tax, but also by those who pay it. That the measure under discussion does not comply with this requirement is best shown by the fact that the secretary of the treasury has explained its meaning in a six-page pamphlet, and the commissioner of internal revenue to whom its collection is entrusted has found its provisions so intricate that he has deemed it necessary to issue a lengthy set of regulations for the guidance of his collectors. This being the case it is to be expected that disputes will be constantly arising in regard to the reasonable construction of the law, between the taxing power and the taxed.

The tax being on the *net income,* ascertained as we have seen by making certain deductions from the "gross amount of the income" one of the first questions to determine is what is "gross income;" under the definitions this would seem to be the gross amount received by the corporation during the year without making any deductions for the expenditures necessary to bring it in. The act specifically provides that the "gross income from which the deductions



WALTER S. NEWHOUSE.

are to be made is the gross income *received* by the corporation within the year." Again the commissioner of revenue seems to have disregarded the word *"received,"* for he states in his directions "it is immaterial whether any item of gross income is evidenced by cash receipts during the year or in such other manner as to entitle it to proper entry on the books of the corporation from January 1 to December 31." Unless there is no meaning to the word "received" this direction of the commissioner is clearly without authority.

These instances which are but a few of many which might be given are cited merely to show the complexity of the act and the difficulty of making fair returns showing the income upon which the tax is to be levied. The dishonest corporation will have but little difficulty in evading payment, while the honest corporation may be excessively assessed, and taxed beyond the requirements of the statute.

The act imposes a tax upon "income received by the corporation *from all sources;"* this would necesssarily include income from real estate, from invested personal property and from all State or municipal securities which the corporation might own. The Supreme Court has held that a tax on the income from land and on the income claimed from invested personal property is a direct tax and must therefore, under the Constitution, be apportioned among the States in accordance with their population. It has also held that Congress has no power to tax income derived from State and municipal securities. Unless, therefore, the court

reverses itself, it is difficult to see why from the income "received from all sources" there should not be deducted income derived from the three kinds of property enumerated.

Assuming that the act will be construed as levying a tax upon the "right to do business as a corporation," the question again arises whether such a tax is within the power of Congress. The arguments of those against the validity of the tax are that the State grants the charter to the corporation, and that the corporation derives its sole power from the State; they claim that the State alone has power to tax its creature; that as the power to tax includes the power to destroy, the Federal government can not have the right to tax a corporation of the State because by such an act it would take away from the corporation the rights granted it by the State.

On the other hand, it is claimed that although the State would have no power to tax a franchise granted by the Federal government, yet that the converse of the rule does not apply and that the Federal government has inherently the supreme right to tax a corporation of a State for the privilege of doing business, unless the corporation is exercising any of the governmental functions of the State. This question it may be fairly assumed will be squarely passed upon by the Supreme Court in the decision about to be made.

## SIZING OF VEGETABLE FIBERS.

BY HERMANN SEYDEL, JERSEY CITY, N. J.

The great development of the sizing industry is directly traceable to the increasing demands placed on the weaving of fabrics. These demands can be classified into three groups; (1) production, (2) perfection and (3) finish of the cloth.

The production of a given number of looms in so far as the size is concerned, depending almost wholly on the tensile strength and the elasticity of the warps, is more closely watched by the size maker than the other two requirements, and I shall give you below some figures which will show you the importance of a good sizing compound in the dressing of warps.

The quality or perfection of the cloth depends greatly on the proper handling of the sizing materials: the boiling of the size and the mechanical aptitude of the slasher hands being almost as important as the judicious choice of the materials used in the making of the size.

As for the finish of the cloth the basic question is the choice of starch, the amount used and the greater or smaller percentage of softening or stiffening agent required. Taken as a whole, this is by far the easiest part of the dressing of warps once the properties of the sizing materials are known and thoroughly appreciated.

With the advent of the power loom, and especially with the popularizing of the automatic loom, the manufacturers began to exact vastly more than plain dressing and the first step to meet this condition was to secure more even starch. To begin with the main ingredient in all sizings, which are applied on vegetable fibres, let me say a few words concerning starches for it is my desire to answer the gentlemen who had the privilege of addressing your last meeting at which time they extolled the advantages of corn and potato starches over one another. After carefully considering their arguments pro and con, I can not see where either was right, for as the kind of starch used in the sizing influences the finish and feel of the cloth, it is clearly up to the manufacturer to make the choice regardless of either the manufacturer of starches or of sizes; but it has been my experience that many manufacturers in endeavoring to economize in the size account very often produce goods which do not meet in hard times with as ready a sale as the goods otherwise warranted.

HERMANN SEYDEL.

It is very evident, for instance, that on a warp which is to be made into a fine and closely woven sheeting, or lawn which should feel smooth on the face, the weaver will find potato starch superior to corn; on the other hand the duck or osnaburg man will take none other but good corn; whereas carpet warps are probably more economically sized with starches ground from other bulbs such as cassava or tapioca. As the kind of starch is therefore dependent of the feel or finish required of the goods the mill man himself is undoubtedly the best judge of what will more readily meet his requirements, but after he has reached a decision on this point he is confronted by the deficiencies of the starches themselves. One will object to the cornstarch boiling too thick, the other that the potato starch will on continued boiling lose its viscosity, the third that the tapioca or cassava will dust off considerably. These deficiencies are inherent with the starches and can be overcome only by the action of some chemicals or the addition of some gums without which no size of real good quality can be made.

The difficulties in the way of compounding ideal sizes are many, as not only do the character and kind of the ingredients depend on the class of goods the size is made for, but the conditions of the plants themselves, both atmospheric and mechanical, require that a very close study be made of the subject, and that the proportions in which these ingredients are mixed should be governed by these conditions.

To emphasize the importance of the size in weaving let me give you the figures reported to me by a very thorough mill superintendent of a successful mill. This mill used in

making up its size the following formula and the tests were made on 30's warps run from 1⅛ inch staple cotton as follows:

Eighty-five pounds of corn starch, 10 pounds of sizol boiled up to 160 gallons. This gave an added weight of 9¼ per cent. and an increase in breaking strength of 17¼ per cent. The second test was made with 80 pounds of corn starch and 15 pounds of sizol boiled up to the same 160 gallons. This gave 9½ per cent. of added weight and 18 per cent. increase in breaking strength. Thus the adjusting of the proportions in the size kettle resulted in one-fourth of one per cent. added weight and three-fourths of one per cent. increase in breaking strength which caused a further and marked improvement in the quality of the cloth and its production; and I can not urge the millmen too strongly to make similar tests and find out exactly where they stand.

Another test of interest is the money value test of sizol and tallow, the sizing being made as follows with accompanying results: Eighty pounds of starch, 15 pounds of sizol, added weight 9½ per cent., increase in strength 18 per cent. Tallow 12 pounds, starch 85 pounds, increase in weight 8½ per cent. and breaking strength 15 per cent.

This is figuring the cost price in favor of tallow and still you notice a difference of one per cent. in the weight and three per cent. in the breaking strength in favor of sizol. These differences were still more apparent in the finished cloth as not only did the production of cloth sized with sizol average five per cent. over that with tallow but the weight of the fabric was three per cent. less with tallow than with sizol. This further difference in weight being due to the excessive shedding which took place from the warps treated with tallow.

From the above figures two deductions can easily be made; the first that tallow is not a sufficient addition to the starch to make a perfect size; the second that it behooves all weavers to use the very best product they can find for their size kettle; and the fact that the results are so evident makes it easy for the superintendent or mill owner to form a very adequate opinion of the relative merits of the sizes on his warps.

### CHARACTERISTICS OF SIZING INGREDIENTS.

In order that you may realize that the choice of sizing materials should be made judiciously I shall give you a few words of advice concerning some ingredients which are used to little or no advantage. First, I shall mention some chemicals; and wish to divide same in acids or acid salts and in alkali or basic salts. Of the first group alum is a type, and this salt being to all practical intent an acid, causes the starch to boil thin which in some cases is good, but its disadvantages are so great that neither alum nor any other acid should ever be used in the making of the size. The first disadvantage is that it activates fermentation with the result of more mildew. The second, that on account of this fermentation, whatever size is left over night or over Sunday is more harmful than of good use, and the third reason is, that under continued boiling the starch is converted into dextrine, and as this process goes on as the warps are run through the size, the first end of the cloth will be sized more heavily than the last. The last, but none the less important, reason for eliminating all acids from sizings is that they attack all metal parts rusting the reeds and harnesses and thereby causing chafed warps and many breaks.

BASIC OR ALKALINE SALTS. Among these I have found in actual use caustic potash and soda as well as soda ash, sal soda, borax and soaps. The use of alkali or alkaline salts as well as soap is probably an inheritance of the times when the starch was home made, and the alkali was used to neutralize the acid caused by the fermentation. Such conditions, however, do not exist at present, and under no circumstances should alkalis ever be used in the slasher box, as they lump the starch and prevent the size from penetrating, causing a very great loss in shedding. Strange to say I have found more alkali used among carpet mills than elsewhere in spite of a very bad effect, which is known to all handlers of jute, of the alkali on this fiber, and whereas the dyer eschewed all alkalis from his dye bath, for some reason or other the size maker had inherited a notion that good carpet warps could not be made without spoiling the fiber.

Among neutral salts are found the chemicals which are of decided benefit to the size maker, but these should be chosen most judiciously, for the haphazard mixing of chemicals will produce results far worse than can be conceived by the uninitiated, and thereby constant danger of one not thoroughly acquainted with the subject using these chemicals without regard of their action or suspicion of the trouble which so often follows.

The use of soap which was so general a half a century ago and which is to be commended in the finishing of fabrics should be discontinued in the size kettle, as on account of the lumping of the starch very uneven results are sure to follow. There is, however, another objection which is far greater and which is probably due to the very nature of soap itself, for it is well known that warps treated with a size containing soap will when freshly sized appear very well and even weave well, but when these warps are older a considerable dusting off of the size takes place, and while one end of the bolt has the required stiffness the other is usually flimsy and lacks in body and weight. This with the unevenness of the face due to the shedding is the main reason why the use of soaps should be discontinued.

Closely related to the soaps are the sulphonated oils such as turkey red oil, soluble oils and corn oil softeners, these oil softeners having the further disadvantage over soap of producing a discoloration in storing, and it is very advisable to keep from using all such oils, for they not being refined will on being stored have the goods acquire a color which is extremely difficult to bleach out or to overcome the dyeing, and which color detracts considerably from the appearance of cloths sold to cutters in the gray.

Among fats I have found some vegetable oils used, but on account of the present high prices of these oils scarcely any are used at the present time except perhaps some little cocoanut oil; but this should never be used, first, because it has absoultely no advantage whatever over tallow, and second because of its many disadvantages the principal ones being its low melting point and the readiness to become rancid acquiring in the oxidation a strong and pungent odor which the converters find hard to eliminate.

There remain but two more ingredients on my list; the first being tallow, and as it is used to a very great extent, and in fact more extensively than any other fat as an emolient in the size kettle, same should be chosen with care both as to its kind, quality, and purity. The market tallow often contains lard and veal or mutton suet, all of which are not of good use, and the latter is especially obnoxious on account of the strong odor which it acquires on storing.

The lard and veal suet are not as desirable as beef tallow on account of their low melting point, and it is therefore important that purchases of tallow should be made with the provision that it be good beef tallow of high titer, the low titered tallow not being of much use, as it does not give the warps the stiffness or body which is necessary that the warps should have to withstand the hard usage on the looms.

The most important cause of trouble in the weave—and especially store-room, is that the average commercial tallow contains a considerable quantity of albumen and gelatine, the latter coming from the bones, the first from the blood which accompany the fats into the rendering kettle and these two ingredients should be by all means eliminated before the tallow is added to the size kettle as both gelatine and the blood are among the best producers and carriers of fungus existing; and I have no doubt but what most of the mildew is caused by these impurities in the tallow. The fungus brought in the size kettle by the tallow is thus scattered over the cloth, and if same be not absolutely dry, it feeds most readily upon the starch of the sizing and the gum which is part of all vegetable fibers, and if this growth is allowed to act on the goods long enough, the cloth can neither be dyed nor bleached properly but will rot in spots and entail considerable loss.

Paraffin wax while having one good quality in its high melting point, its faults are so many that its use is very limited. By separating from the rest of the size it sticks to the warps in spots and this, as you know, causes so much trouble in the bleaching and dyeing that it is hardly worth while mentioning this material.

## PROGRESS OF THE DIESEL ENGINE.

BY E. D. MEIER, NEW YORK CITY.

It is hardly necessary in an assemblage of cotton manufacturers to emphasize the importance of well regulated power. Textile machinery has such delicate manipulations to perform in bringing the fluffy fibers of cotton or wool from the tangled condition of the raw material in the bale, to the parallel and uniform layers of the roving, to twist this fragile cord into strong and even yarns, true to weight and number, and finally to weave these into the smooth texture of cloth of exactly the required weight, that uniformity in power and speed is the essential and indispensable quality in the prime mover. Water wheels or turbines driven by a stream of water constant in head and volume have this virtue in eminent degree. The steam engine had been developed and improved for more than half a century before the genius of Corliss found the rational way of governing the cut-off, thus achieving regulation and economy at one stroke.

This great advance in steam engine practice grew from the intelligent demand of the American cotton spinner. Further improvements followed, both in efficiency and capacity, until in 1876 the 1,400-horsepower Corliss engine driving the machinery of the Centennial Exposition at Philadelphia, furnished a climax. Thurston, born and bred in your New England hive of industry, after much careful experimenting with steam pressures up to 500 horsepower and incisive mathematical analysis of his results, concluded in 1897 that in actual daily practice the best efficiency we can hope for from

| | | | | | |
|---|---|---|---|---|---|
| Steam at | 200 | pounds | pressure | is 12 | per cent. |
| " " | 500 | " | " | " 14.2 | " |
| " " | 1,000 | " | " | " 15.6 | " |

of the energy stored in the coal.

By a curious coincidence it was in this same year that Diesel proved with his first 20 horsepower internal combustion engine that 28 per cent. of the heat value of the kerosene he burned could be realized in actual power in the engine shaft. Early the following year, at the suggestion and risk of an American manufacturer, Diesel showed that his engine could accomplish the same results with the cheap American gas oil or fuel oil of commerce. Lord Kelvin, in a report on this new marvel, stated that "Diesel has actually obtained 58 per cent. more work than has been given from the same weight of oil by any of the best oil motors previously made."

The principle of Diesel's engine was entirely new, as he uses no charge or mixture but compresses only the air to support combustion, and then introduces the fuel under perfect control into this red hot air, maintaining constant pressure during combustion and expanding after the introduction of the fuel ceases, exactly as a steam engine does after cut-off. The economy thus secured, Diesel gave his attention to regulation and a few years later developed for this an extremely simple principle on which all later improvements in governing engines of the Diesel type are based.

While during the last decade great improvements have been made in internal combustion engines of the explosive type (witness only the marvelous development of the automobile motor) the natural limitations of explosive combustion where a mixture or charge is essential, have thus far prevented the accomplishment of accurate regulation.

In his engine Diesel had to slice off a small disc from a mere thimbleful of a heavy incompressible liquid. Five years after his first engine was built he found the principle, and in a few years more his faithful assistants developed the mechanical means of perfect regulation. The American builders of Diesel engines confidently guarantee the speed regulation within two per cent., above or below the mean rated speed.

Thus, while in 1899 we could compare the Louisville Leavitt engine of 13.83 per cent. efficiency, and Rankine's ideal (theoretical) steam engine of 26.2 per cent. with a practical (though small) Diesel engine of 28 per cent.—our modern somewhat larger American Diesel engines exceed 30 per cent. efficiency.

The conservative guarantee adopted some years ago, that the consumption of fuel oil per 100 horsepower hours of net work shall not exceed eight gallons, that is 0.568 pounds per horsepower hour, has been easily maintained and is now extended to cover running at any capacity between full rating and half load. In actual duty trials on the company's testing beds, much better results are obtained. At full load the average consumption was only 5.78 gallons (highest 5.94, lowest 5.59) per 100 horsepower hours, at three-quarter load 5.83, at two-thirds load 5.91, at half load 6.03, at one-third load 7.27 and at 10 per cent. overload 5.93 gallons.

You will naturally want to know what ratio these figures bear to those with which you now reckon your power cost. Let us, for the sake of argument, allow that these figures will be exceeded in every-day practice, and instead of 5.78 gallons take 6¼ as the consumption per 100 brake horse-

power hours, and an average price of 3 cents per gallon for the fuel oil. Then to get from your non-condensing engine the same economy as the Diesel, you must buy your coal for 39 cents a ton delivered on your grates in your boiler furnace; while if you have a good condensing engine you may pay as high as 62 cents a ton. If you live in a favored region where criminal waste has not yet exhausted the natural gas, you can reach Diesel power cost if you buy your natural gas for 19 cents per 1,000 feet at the gas valve of your gas engine; ordinary illuminating gas you must buy at 12 cents. If you use producer gas you must not pay more than $2.10 for hard coal or 72 cents for soft coal in your producer, including labor, and you can not afford to pay more than $9.75 per horsepower year for your water power, nor more than one-half cent per kilowatt hour for electric current.

The repair account of the Diesel engine is moderate. The average for 21 engines of the 225 horsepower size, as reported by the owners, amounts to a trifle over 13 cents per horsepower per annum, the records covering about four years' service. There are installed in the United States 162 Diesel engines aggregating 30,240 horsepower; of these 47 engines aggregating 10,60 horsepower are repeat orders, and 15 engines aggregating 3,010 horsepower are in daily service in textile mills.

## THE DISTRIBUTION OF ARTIFICIAL LIGHT.

BY FRANK MARSHALL SCANTLEBURY, BOSTON, MASS.

It is undeniable that the light in the textile mill of to-day is of greatest importance. If we compare the modern mill with its present day weave shed and the stuffy weave room of the past we find a great difference. In the former, we will find that not only the sides of the building are literally one sheet of glass but the roof is constructed 50 per cent. of ground glass, allowing just as much light to enter as possible, with the result that the interior is as bright as the average greenhouse. In the old shed the aim seemed to be to crowd as many looms into one building as possible. Therefore, you will find mostly all the older buildings three and four stories high and in certain sections so dark that artificial light is necessary at all times.

Perhaps the most surprising thing in this connection is the apparent disregard of artificial lighting and the crude methods in existence in some of the big mills. It would surprise a good many people were they to know, that some 30 large mills are using gas for illumination in New England alone, and were we to stop and consider that, with the improvements recently made in the electrical field, they could not only secure a much better light but could increase their efficiency 50 per cent. at a saving of about 25 per cent. in dollars and cents over gas, it will be difficult to understand why the illumination of yesterday is still in existence.

There are, however, mills who monthly sacrifice thousands of dollars through sheer waste of illumination. It is a safe estimate that some $20,000,000 worth of illumination is wasted yearly in the United States alone. Not as we might suppose by neglecting to extinguish the lights that are not in use or in other ways, but rather by the failure to control illumination.

In industrial fields the lamp most generally used is the old carbon and of this type the 16 candle power style predominates. The current consumption of this lamp figured in watts which is the term used to measure the electrical energy necessary to produce light, is 3.5 watts per rated horizontal candle power. Therefore, if this lamp produces 16 candle power the amount of current it requires is 56 watts, 1,000 watts equal 1 kilowatt and the rate for a kilowatt hour varies from three to fifteen cents.

The Gem lamp is an improved type of the carbon lamp, having however, instead of a carborn filament a carbon filament heated to such a degree in an electric oven that it takes on the properties of metal and hence the name, Gem "Metalized Filament." This lamp requires but 2.5 watts of electrical energy to produce one rated horizontal candle power and it gives out a good, strong, white light. About two years ago the Tantalum lamp made its appearance on the market. This lamp was named after the metal that constituted its filament, the filament being spun on what is known as a tree, supported by a glass pole. This particular type of lamp had the advantage of consuming but two watts of electric energy to produce a candle power and in addition to this was a very strong lamp and would

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stand a great deal of hard usage. This latter feature, however, was only true when the lamp was burned on a direct current line, and experiments showed that the filament would not stand the alternating current line in a satisfactory way to any extent whatsoever. This lamp had hardly had an opportunity to become a popular addition to the commercial world before the Tungsten and Mazda lamps made their appearance. In both these lamps we find the very highest developments in the electric lamps of the present day. They give perhaps the whitest and best artificial light that has ever been discovered next to acetylene gas. For comparing color values the light given by these lamps is superior to all others as they show up color values when used in conjunction with a good reflector almost equal to daylight. Perhaps the most surprising thing is the low consumption of current necessary for them to produce light, they requiring but 1.25 watts per candle power. The popularity of these lamps among the textile

trade is increasing daily, and it is safe to say that the day when they will replace the carbon lamp is not far off.

Illumination, however, and light are two distinct and separate things. For instance, a room may be well lighted but poorly illuminated. Light is the cause, illumination the effect, and unless we control our illumination we are virtually throwing money away.

For example, the carbon lamp of the 56 watt type used in most of our mills is termed a 16 candle power lamp and by 16 candle power we mean that directly off the horizontal we are getting 16 candle power while directly off the end of the lamp our end on candle power amounts exactly to 6.5 candle power.

This fact is generally known and to remedy it a flat enamel reflector, usually the cheapest tin reflector made, is placed directly over the light. The results obtained by doing this is to redirect three candle power into the horizontal and does not result in building up the end on candle power to any appreciable extent. Illumination can be concentrated or spread over a large area in exactly the same manner as water in a hose. If concentration is required a reflector made of glass prisms produces astonishing results and this system so positively controls the light rays that almost any distribution or concentration can be accomplished by its use. This principle of the control of illumination by glass prisms is based on the discoveries and experiments of Blondell and Psaroudaki who originated the system. In all highly polished surfaces there exists what is known as a critical angle of reflection. In the case of reflection by the aid of prisms the light leaves its source, enters the prisms, strikes the critical angle and from there is reflected across to the third side; this being a critical angle reflects the light back again to its source. It can, therefore, be readily seen that by keeping the angles of the reflector the same uniform size throughout its entire length and by curving them the spread and distribution can be regulated according to the requirements.

The most durable and efficient proposition in opaque reflectors on the market to-day is one that has gained its entrance into hundreds of the foremost mills in the country. This reflector embodies all the very latest developments in the science of reflection and vies with the prism glass reflector in the control of light. It is constructed of steel spun into shape by hand over a wooden chuck which is scientifically considered to have the correct curves and to possess the shape best adapted for control of light. The spinning process has the effect of leaving the interior surface porous and when the reflecting surface, which is of absolutely pure aluminum is applied it is annealed in such a manner that the aluminum works itself into the porous places and gives us a reflecting surface which is known as a "mat or satin finish." This is the very finest reflecting surface known, for in addition to its reflecting a very strong light, it has a distinct advantage of being able to whiten the yellow rays of a carbon lamp to a very large extent and also defuse them. The best illumination given forth from an opaque reflector is that given from an irregular reflecting surface. In other words, a surface that will break up and scatter the light rays while reflecting them. Good light means good work, and the man who tries to economize at the expense of his operatives' eyes finds that it is a very unsatisfactory method.

Distribution and control of light by opaque reflectors is accomplished entirely by their science in design and lamp position so that in order to fully control the light given from a lamp it is absolutely necessary to cover at least three-fourths of it with a reflector.

By using the Mazda or Tungsten lamps in conjunction with the new bowl type steel reflector we get an exceptionally fine light. A reflector known as the S-E-60 will give us at some points when used with a 60 watt Tungsten lamp, 66 candle power, while directly under the light we have 35 candle power. By experiment we have found that we can use this same combination to illuminate four cotton looms. Here a remarkable saving is shown as the lamp consumes but 4 per cent. more electricity than a 16 candle power, carbon lamp does, and we find that our light by actual photometric test on our looms is about 300 per cent. better than with the carbon installation. This is the only opaque reflector known that will give this peculiar curve and it shows the possibilities within our grasp by its use in conjunction with Tungsten or Mazda lamps.

There is an S-I type of the same bowl reflector that will give us 68 candle power from a 50 watt lamp directly beneath. This reflector used over sorting tables and inspection tables is found to be a particularly good type. At the angle of 45 degrees our reflector gives us 69 candle power. In all cases where the Mazda and Tungsten lamps are used it is absolutely necessary to use a reflector that will conceal the light, protect the light and reflect the light. The extreme brightness of the lamp makes it very difficult for the eyes. Large units in the Mazda and Tungsten types are also inadvisable unless they are used plentifully or high above the floor, as they produce the same effect as arcs and render sections of the room absolutely dark, should they give out at any time. The scheme of laying the units out of squares is found to be the most satisfactory way of solving the general illumination problem in the textile mills, and this plan is advised wherever that style of lighting is desired.

## BUYING AND HANDLING OF STEAM COALS IN NEW ENGLAND.

BY JOHN S. LAWRENCE, BOSTON, MASS.

The object of this paper is to familiarize New England textile manufacturers with the economic waste existing in the mining, shipping and burning of coals coming to this section, and to throw some light on the possible solutions of these problems.

In 1908, New England's total coal consumption was about 24,000,000 tons of 2,240 pounds each, for which over $100,000,000 was paid. The exact statistics are not obtainable, but it is estimated that there was an increase of approximately 100 per cent. in the steam coal consumption in the ten years from 1898 to 1908. Of this enormous quantity, approximately 8, 600,000 tons were anthracite and 15,400,000 tons bituminous coal. Of this total, 16,000,000 tons were discharged at New England ports, while 8,000,000 tons were received all-rail from the mines. In the entire United States, where the population and area approximate 5 per cent. of the globe, there is consumed over one-third of the coal consumed in the entire world.

New England's coal supply comes from the North Appalachian fields of Pennsylvania, Maryland, West Virginia and Virginia. This field is the richest and most extensive one in the world. In general the hardest coal is found close

to the backbone of the Allegheny ridge, and as one travels northwest and southeast at right angles to the mountain ridge, the coal becomes softer and more volatile. It is for this reason that coal is usually known by the place from where it is mined, as the geographical location closely indicates the character of the coal to be expected. In passing, I want to say that there is deplorable waste in the mining of coal, but I am glad to say that this matter is now under careful consideration by the United States government.

Rail and water coal, commonly known as tide-water coal, approximately about 70 per cent. of our supply, is loaded on cars at the mines, shipped over the coal roads in train-load consignments to seaboard, a distance of from 200 to 400 miles. The principal ports of shipment are Newport News, Norfolk, Philadelphia and Baltimore. At these ports the coal is dumped from piers into sailing vessels, barges or steamers, and transported to the various ports along the New England coast, where it is delivered direct to such industries or dealers who have discharge plants at tide-water, or else transferred through semi-public discharging plants (most of which are closely associated or owned by the New England railroads) to cars for reshipment to interior New England points.

The price of best bituminous coal at the mouth of the mine has varied in the last six years from $1.60 to less than $1.00 per ton, while some West Virginian coals average at the mine as low as 96 cents per ton. The average cost to carry this coal to New England consumers is about $2.50 per ton—consequently the best coals usually find their way to our New England furnaces. The all-rail coal rates, if plotted on a map, will be found to follow in general the contour of the water line of New England, and the highest point will be found to be about fifty miles from the coast.

The cost of tide-water transportation is therefore the determining factor on rates, so let us consider the expensive method employed as compared with that which might be used under efficient common ownership.

1. Vessels vary so in type that a standardized loading plant is not practicable. The sailing vessels' cargoes must be carefully trimmed, while the modern coal barge or steamer has its hatches so arranged and its bins so constructed that comparatively little trimming is necessary.

2. The unloading at destination suffers from the same trouble. Modern open-hatched vessels can be unloaded with ease compared with the older types. The arrival of sailing vessels is irregular, and frequently laden vessels have to lay in port for days awaiting their turn, so that unloading plants are at times forced beyond their economic capacity, and at times idle, yet these sailing vessels carry a large per cent. of our water-borne coal, operating themselves cheaply, but putting others to great expense. The more modern vessels being more expensive can less afford to lose time in waiting their turn or unload at any but the most modern plants.

3. Due to this irregular unloading New England railroads can not be expected to keep sufficient equipment to meet the busy days, and many times cars not adapted for the purpose must be used. Long demurrage on cars, four days being allowed to comply with the laws of some New England States, is due to lack of standardized unloading facilities at the plants themselves. One plant requires side dump cars, one bottom dump, while others shovelers, which makes economical operation of railroads impossible and prevents those consumers using modern plants from benefiting by the economy to which they are properly entitled, with the result that even at the high rates, New England railroad earnings on coal are extremely small.

The Boston Chamber of Commerce last year in their report entitled "The Buying and Handling of Steam Coal" compiled a most interesting table showing the comparative analyses of coals from different sections as represented by some 2,000 samples. It is well worth every coal buyer's study.

Recently 300 postal cards were sent textile mills throughout New England inquiring their consumption of coal and certain other questions of interest for tabulation. The number of replies received was 115, which in total represented 936,080 tons. Distribution of the above tonnage was as follows:

| | |
|---|---|
| Massachusetts | 629,376 |
| Rhode Island | 141,704 |
| New Hampshire | 48,160 |
| Maine | 43,200 |
| Connecticut | 42,400 |
| Vermont | 31,240 |

About ten who replied did not know what kind of coal they were using. Of the 115 replies, 50 stated that they had facilities for handling modern dump cars, and of these who had modern facilities the dump cars supplied by the railroad were as follows:

14 were supplied with between 75 and 100 per cent.
2 " " " " 50 " 75 "
2 " " " " 25 " 50 "
4 " " less than 25 "
20 did not specify.
8 were supplied with none.

Twenty-two, representing a total tonnage of 79,365 tons, were located on the line of the railroad, who for lack of facilities had to shovel coal from the cars by hand, a wasteful process not only for themselves but for the community.

The sources of coal purchased by those replying were as follows:

| Mining District | Tonnage |
|---|---|
| New River | 269,360 tons |
| Pocahontas | 183,520 " |
| Clearfield | 65,000 " |
| George's Creek | 14,640 " |
| All others were | 403,560 " |
| | 936,080 " |

One showing evils should also endeavor to show the means of rectifying them; and in this connection I would suggest four remedies.

1. Establish a standard for coal-carrying vesssels and for loading and discharging plants.

2. Use only such vessels between these standardized plants as can maintain a regular schedule.

3. Establish standard unloading plants throughout New England, for the prompt unloading of cars, and standard railroad equipment adapted to meet the more regular demands.

4. Careful study by experts on the burning of coals and experiments to ascertain which brings the best results.

It would be desirable to form a representative New England commission who after a careful study of this subject would recommend standard equipment and suggestions, together with the best methods of popularizing them, with the idea that changes and new equipment might conform to

a general scheme, in the same way that a far-sighted manufacturer would lay out his property.

Railroads have standardized their gauges and their equipment to a marked degree, and this in spite of many owners of different interests, a situation not so difficult as the one suggested in this paper. Where a tangible saving of this kind can be made, a great part of it usually accrues to the consumer, and of the enormous coal bill of New England—$100,000,000 (which in 1920 will probably be $200,000,000)—a small per cent. of saving would amount to millions of dollars a year, and being everybody's, it is nobody's business to bring about quick, reasonable public economies, the lack of which contributes to the high cost of living.

## ADVANCES IN CHEMISTRY OF COAL TAR COLORS.

BY HUGO SCHWEITZER, PH.D., NEW YORK CITY.

In view of the far-reaching possibilities of synthetic chemistry and the fortunate co-operation of science and technique in the industry of coal-tar colors, an enormous progress is yearly registered. In the time allotted me I can therefore take up only some of the most important advances which have been recently made, and I shall especially restrict myself to reviewing those new dyestuffs which possess extreme fastness, surpassing in that respect everything which either nature or chemistry has hitherto produced.

The most wonderful advances in the production of new colors of extreme fastness are to be found in the class of alizarin colors. Since the first production of synthetic alizarin in 1869 up to about 1888 the progress in the alizarin colors was very slow, and only a few representatives had been placed on the market. A very rapid change took place when the hydrolization of the then known alizarin colors by means of concentrated sulphuric acid was first observed by Rene Bohn, and such colors as the anthracen blues, alizarin green, alizarin indigo blues and the series of alizarin cyanines and their derivatives were added to the alizarin group. These were soon followed by the discovery of Robert Schmidt of the beautiful acid dyeing alizarin colors, such as the alizarin saphirols, the alizarin irisols, the alizarin viridines, the alizarin astrols, the emeraldols.

The most interesting stage in the development of the alizarin series was reached when Rene Bohn discovered the class of vat dyeing alizarin colors called after its original member the indanthrene colors. The first indanthrene was made from beta-amido-alizarin. Not only that the substances discovered by these reactions are important and valuable dyestuffs, but they are also of the greatest scientific interest. The most curious ring formations were observed and the establishment of the constitution of these complicated bodies required the greatest ingenuity, and such research as the Scholl synthesis of Flavanthrene belongs to the classical work accomplished in chemistry.

As late as August 1908, the inventor stated in a lecture that simpler derivatives of anthraquinone also furnish vats by such reduction, but these vats have no affinity for the fibre, and it seemed to him that at least two anthraquinone nuclei must be condensed with each other and must have in each nucleus at least one keto group in order to furnish suitable vat colors. This rule, however, has not been definitely established, for later research has shown that very simple anthraquinone derivatives are excellent vat dyestuffs. In the same lecture Bohn divided the indanthrene colors into five distinct groups:

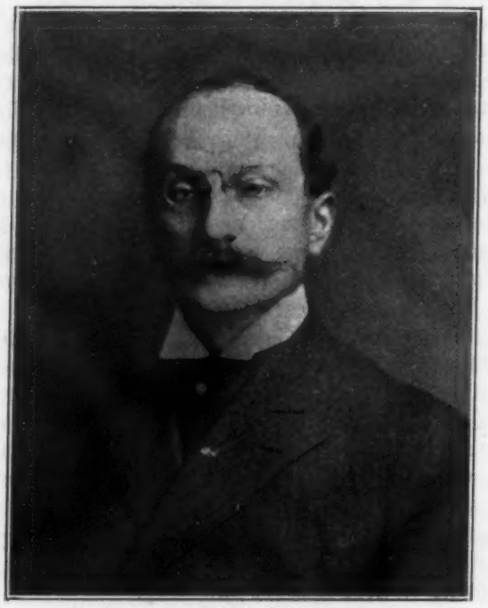
I. *Indanthrene colors,* embracing the colors of the indanthrene type, its halogen-, amido-, and oxy- derivatives, flavanthrene, pyranthrene, auranthrene and their derivatives.

II. *Benzanthrone colors,* embracing the violanthrenes, indanthrene-violet, nitroviolanthrene and isoviolanthrene.

III. *Cyclanthrene colors,* embracing indanthrene-bordeaux, indanthrene red.

IV. *Algol colors,* embracing algol red, etc.

V. *Colors of still unknown constitution,* such as melanthrene, fuscanthrene, indanthrene brown, olivanthrene, indanthrene orange, indanthrene copper.



HUGO SCHWEITZER, PH.D.

VI. To these five classes we may add as a sixth group the simple anthraquinone derivatives with only one anthracene nucleus.

With the extremely stable flavanthrene an interesting observation was made which at first thought threw doubt upon its fastness. The material of an air balloon was dyed with flavanthrene. In the intense rays of the sun at some thousand meters height the yellow material turned green. It was found that this change was not caused by the influence of light, but was rather due to the reduction of the flavanthrene by the cotton fiber under these extraordinary conditions; for after landing and keeping the material in the dark, it resumed the original color by the action of the atmospheric oxygen. Under ordinary circumstances the reduction of flavanthrene by the cotton fiber is seemingly counterbalanced by the oxidation of the atmosphere and the stability of flavanthrene on the fiber must obviously grow with age because the oxidation remains always the same, while the reduction by the fiber becomes gradually weaker.

The above described ingenious synthesis of Scholl led to the production of pyranthrene from the intermediate dimethyl-dianthraquinonyl, which by heating is converted

into a substance furnishing a bright red vat and dyeing cotton red, which changes on washing into a yellow orange of extreme fastness. The pyranthrenes are the first examples of reddish yellow vat dyes which contain no nitrogen in their molecule.

The auranthrenes are derivatives of anthraflavon. They stand in very close relation to the pyranthrenes, as they are also free from nitrogen. Anthraflavon is produced from betamethylanthraquinone by condensation with itself (U. S. Pat. 837, 840, Fr. Pat. 355,100.) It furnishes a brownish red vat which dyes cotton brown-red, turning pure yellow on washing.

If we now take up the second group, we find here as the mother substance, benzanthrone which is produced by condensation of anthraquinon with glycerin (U. S. Pat. 809,802-3-4).

The discovery of this substance was brought about by subjecting betaamidoanthraquinone to the Skraup synthesis, in the hope of producing a quinoline analogous to alizarin blue which is formed from betaamidoalizarin in the same reaction. It was found, however, that the reaction did not stop at the quinolin formation, but that another molecule of glycerin was included in the condensation, thus forming a substance named benzanthronequinolin. An explanation for this peculiar behavior was afforded by the fact that the hydroxyl groups of alizarin prevented the entrance of a second gylcerin molecule into the newly formed substance. When afterwards anthraquinone itself was condensed with glycerin directly, the above benzanthrone was obtained. From benzanthrone by heating with caustic alkalies violanthrene is produced. The violanthrenes dye intensely blue violet, give very fast shades, and are the first example of blue colors, dyeing the vegetable fiber without any mordant, which do not contain any nitrogen in their molecule.

From benzanthraquinoline by melting with caustic alkalies the cyanthrenes are obtained, the constitution of which is not yet fully established. It can be easily seen that a large variety of vat colors can be produced from these mother substances and their condensation products by halogenization, etc.

The algol colors belong to the fastest dyestuffs known at the present day. To the group of colors of unknown constitution belongs melanthrene obtained from various diaminoanthraquinones (1.5, 1.8, 1.3, 2.6, 2.7) by melting with caustic alkalies. They dye cotton bluish grey to reddish grey. The fuscanthrenes are produced when the formaldehyde compounds of diaminoanthraquinones (1.5, 1.8) are heated with caustic alkalies. They dye reddish brown.

There is no doubt that the excellent results obtained with the anthaquinone vat colors in the dyeing of cotton of all possible shades will bring about a complete revolution in this art. The method of dyeing in a vat is comparatively easy and cheap and the day is not far distant when the mordant-dyeing cotton colors, the direct substantive cotton colors, and the sulphur colors will be driven out of the market. While these colors are of such great importance for the dyeing of cotton they possess hardly any affinity for wool. Such anthraquinone colors are, therefore, not "true vat colors," a designation which is reserved for indigo, its derivatives and analogous substances, which possess affinity alike for the vegetable and animal fiber.

In the chemistry of these colors results have recently been obtained which, if anything, are more important than those described above.

The grand accomplishment of the economical synthesis of indigo has made it possible that a number of derivatives, such as the chlorinated and brominated indigoes, can now be cheaply manufactured. Of especial importance among them are the brom-indigoes known in the market as M L B/R/2B/4D/6B, brom-indigo F B, indigo R B, RB N, ciba blue BN, 2B, these being blue vat dyes possessing, however, much greater fastness to chlorine than indigo itself. These derivatives are for the most part obtained by direct chlorination or bromination of indigo. The synthesis of indigo also permits the direct preparation of indigo substitution products by the final condensation of substituted phenylglycin ortho carbonic acids, and in this manner various derivatives of indigo have been obtained.

But the most remarkable development in this group of colors was accomplished when Friedlander in his efforts to produce the purple of the ancients, succeeded in discovering new reactions which permit the preparation of an endless variety of most valuable new vat dyes. The observation which gave Prof. Friedlander the clew to his further experiments was his discovery that cumaranon was a substance which greatly resembled indoxyl in its atomic grouping and its chemical behavior. Both substances are converted into colors by oxidation, in which reaction cumaranon furnishes a nitrogen free substance analogous to indigo which dyes a red shade, but is very fugitive.

The great fastness of the sulphur colors gave Friedlander the idea of producing a sulphur analogous to indigo. He thus prepared 3 oxy 1 thionaphthen which is cumaranon containing sulphur instead of oxygen, and which on oxidation furnishes a sulphur indigo, which proved to be a color of great fastness and was introduced into the market as thioindigo red. Although this reaction is known only a few years, yet more than twelve products giving all shades have already been placed on the market. This variety of colors seems to be due to the fact that by substitution a greater influence on the shade is brought about than with similar substances, and further to the fact that oxythionaphthene can be condensed with many analogous bodies.

In this manner four groups of true thioindigo colors are distinguished.

1. Symmetric colors, embracing thioindigo, (also called vat red or helindon red) heliondon orange and cibabordeaux B, which is brominated thioindigored B.

2. Asymmetric colors of which no representatives are in the market. The product corresponding to thioindigo is rather similar to the latter color but possesses inferior dyeing properties.

3. Mixed symmetric colors, embracing cibaviolet B and thioindigoviolet.

4. Mixed asymmetric colors, embracing thioindigoscarlet R, its dibrominsubstitutionderivative, thioindigoscarlet G, cibrated G, thioindigoscarlet 2 R, cibascarlet 2 G.

A tremendous activity in this field is constantly observed, and more than three hundred German patents were issued in 1907 and 1908 for thioindigo and analogous substances.

It seemed that with the introduction of the indanthrenes, algols, thioindigos, what seemed well-nigh impossible has been accomplished. Yet there are constant new demands; style prescribes the weaving together of various fibers which must be dyed either of like or different shades, dyeing machines are being invented which establish new conditions

as to the reaction and consistency of the dyebath, and thus an active competition is maintained which resembles the rivalry between the manufacturer of armor plates and projectiles.

In conclusion, it may be of interest to review what colors of animal and vegetable origin were at the disposal of the dyer prior to the introduction of the aniline colors, and by presenting such a list it will be easy to demonstrate the utter inadequacy of the natural products for modern requirements. As red colors there were used madder, Brazil wood, orchil, cochineal and lacdye. Artificial alizarin is incontestably superior to madder in every respect and many red azo dyestuffs possess dyeing properties which make them of infinitely more value in the textile trade than the natural products, of which Brazil wood is characterized by proverbial fugitiveness.

For yellow shades the dyer of olden times had at his disposal fustic, quercitron and Persian berries. There are now many direct cotton dyeing coloring matters and many wool dyes which by the after treatment with chrome become perfect substitutes for these yellow dyestuffs in every particular.

The most important natural blue was indigo which has now become an artificial color, and to such an extent that for the last few years importation of natural indigo to the United States has practically been abandoned.

Logwood was mostly used for blacks. It has been largely superseded to-day by artificial colors, which possess many more valuable properties for every application, so that logwood is employed only where it appears advantageous on account of low price. Natural browns, such as catechin, are surpassed by the brown sulphur colors, and Saunders wood is in every respect inferior to alizarin brown.

## A SUBSTITUTE FOR COTTON; AND A NEW METHOD OF OPERATING RING FRAMES.

BY JAMES HOPE, ROUEN, FRANCE.

### A Substitute for Cotton.

In compliance with a request I am showing you substitutes for cotton, both in the yarn, and in plain and dyed piece goods, and also in combination with worsted.

This is made from spruce wood pulp by a process invented by a Frenchman, and is called La Soyeuse, and arrangements are being made for its extensive production in both England and on the Continnent, but I understand that it is not as yet manufactured in this country.

Although it is termed a substitute for cotton, the samples will indicate that it does not have the identical effect, as it takes on dyes, bleaching and finishing more brilliantly than the cotton fiber.

It will resist boiling in water or caustic potash solution for some minutes without change and its combustibility is certainly no more rapid than that of cotton.

The costs of its manufacture is much lower than that of the market price of cotton.

The fiber can be made of any length, as in the case of artificial silk, which it does not resemble in other characteristics, being, as was stated above, highly resistant to solutions.

The strength of the yarn apparently exceeds that of cotton, although I have not any comparative tests.

### A new method of operating ring frames.

Flexible and high speed spindles are now universally adopted, but spinners can not take the maximum advantage out of them with a constant speed drive, but to profit by this it is necessary to adopt a variable speed drive. As every student of ring spinning knows, that the weakest part of the yarn is at the roll before it has taken any twist, and a limited speed has to be resorted to, the cause of this is due to the extra strain on the yarn, resulting from the acute angle formed at this stage by the thread, but as layer upon layer is wound on, the frame may now be run at a ten per cent. higher speed without any detriment or more breakage of the yarn. Many devices, both mechanical and electrical, have been tried to attain the required acceleration with more or less success.

The patent accelerator which will now be described has been most successful and over 600 are now at work and giving entire satisfaction, obtaining an increased production on an average of seven to nine per cent.

This invention consists of a sliding pulley, having two diameters and a clutch screwed on the driving shaft, and other mechanism. As soon as the ring plate arrives at the high level, with the cop bottom at full diameter, it pushes a lever towards the left; the same movement releases a bracket, bringing it in contact with a cam shaft. Up to this movement, the smaller diameter of the sliding pulley has been lodged inside the loose pulley, but by means of a weight and chain fastened to a lever, connected to another lever, the sliding pulley is brought in another position.

As it has been seen, it is a substitution of pulley, which acts automatically at a certain time. When the cop bottom has been formed by the pulley of large diameter, that is to say, at the highest possible speed during the critical period, the adjustable movement comes into action automatically, and brings the pulley of small diameter slowly under the strap. This produces an acceleration proportional to the relation existing between the two diameters of the pulleys. This substitution of pulley is made automatically without jerk or removal of the strap. The increased speed is brought on gradually, and without breakage of yarn, and that is the most important point. Experiments have been made on numerous frames, on which the accelerator has been applied for more than two years, and the increase of production has been put down from seven to nine per cent.

The patented motion can be applied to any make of machine in a few hours. For the spinning of the cops or of the weft, it might be necessary to come back to a slower speed towards the top of the tubes; nothing is easier with this variable speed movement. It would only be necessary in this case to bring the larger pulley under the strap, at the proper time.

### Advantages of the accelerator.

To grasp properly the advantages and the importance of the automatic accelerator with double speed, it is necessary to notice that, during the period of the total formation of the bobbin, the ballooning of the yarn is not constant, that is to say that from the time of the beginning of the spinning until the complete formation of the cop bottom, or otherwise until the full diameter of the bobbin has been reached; there is no ballooning of the yarn, which fact proves that during this period, the tension is at its maximum. It is this precisely which has always been an obstacle to the increase of speed of spindles. But passed this critical period, the ballooning of the yarn takes place, and

this has made the use of anti-ballooning separators (blinkers) necessary. It is now seen that the strain on the yarn has diminished considerably and it is so until the end of the doffing.

Consequently, admitting that the cop bottom has been formed at a speed of 10,000 revolutions per minute conveniently, in spite of this excessive tension on the yarn, there is no harm in increasing the speed of 1,000 revolutions to form the remainder of the bobbin, seeing that, in spite of this increase of speed, the conditions of spinning are still more satisfactory, it being impossible for this acceleration to bring about the suppression of the ballooning. In order that the increase of speed should bring us back to conditions as unfavorable as during the period of formation, it would be necessary, at least in theory, to attain a speed such as would make the ballooning disappear again.

Spinning is made under the following conditions: The rings being provided with travelers two counts lighter, the formation of the cop bottom at a speed of 10,000 revolutions, is improved owing to a reduction of strain on the yarn, and from the time when the acceleration takes place, the lightness of the traveler is compensated for by the air resistance resulting from the increased speed as well as by the decreased friction, but multiplied by a larger surface covered. It is then seen that this lighter traveler used with the accelerator, must be considered as a traveler of variable weight.

In reality, in a frame working at a constant speed, the air resistance, the development of the surface of friction covered by the traveler, must be considered as constant. It is not the same with the accelerator, when the varying speed acts on the traveler.

Power Absorbed.—Experiments have been made, and it is calculated that for the extra power used, compared with the extra production obtained, it is in favor of the accelerator, and that yarn can be spun at three-quarters of a cent per pound cheaper than constant speed.

Comparisons have been made as to what is the limit or maximum speed that twist ring frames may be run on constant speeds; on say 32's, from good American, and at 10,000 revolutions the waste bill begins to show notwithstanding the extra fatigue to the tenders, but higher speeds may be run with a variable speed motion, as the following data will show, as being taken seriously and conscientiously on the same frame, in the same room and with the same tenter, a week's average for each trial being taken.

| Constant Speed Drive. | Speed Front Roller 1 inch. | Yard Produced. | Waste. |
|---|---|---|---|
| 1 week. | 140 revolutions. | 640.2 lbs. | 5.32 lbs.=.83 per cent. waste |
| 1 " | 153 " | 697.4 " | 7.50 " =1.04 " " " |
| **Variable Speed Drive.** | | | |
| 1 week. | 140/153 revolutions. | 688.6 lbs. | 6.95 lbs.=.88 per cent. waste |
| 1 " | 153/168 " | 756.6 " | 7.5 " = 1 " " " |

From the above data, a lesson may be taken, how to obtain the best results, as the above speeds are above the average, but by adopting a more moderate speed, say 130 revolutions at the front roller to build up the cop bottom, and 142 revolutions to finish the cop, a good production of yarn may be obtained with a minimum of waste. This may be easily achieved and at little cost by adopting the mechanical variable speed motion, without displacing the vertical position of the belt.

# TEXTILE EXHIBITORS' ASSOCIATION.

The annual exhibit of the Textile Exhibitors' Association, held in Mechanics Hall in connection with the annual meeting of the National Association of Cotton Manufacturers, proved to be a most interesting and valuable adjunct to the annual meeting of the Association. Much credit is due President F. H. Bishop, Secretary C. I. Campbell, M. H. Merrill, E. F. Hathaway, D. A. Corey and H. W. Butterworth for the success of the undertaking. The importance with which the exhibition is regarded by the manufacturers was shown forcibly by the fact that 17,000 square feet of space were required for the exhibit, as compared with 9,000 square feet last year.

While each exhibit showed the indviduality of the exhibitor in the arrangement of its display, yet all were pleasing to the eye, and gave a clear insight into the details of the different machines of the different makers. The exhibit lasted a week, and was open all through the day and evening. The crowds of visitors, including not only textile men but others interested in machinery and mechanical devices, indicated clearly the popularity of this feature. The following brief descriptions of some of the exhibits will indicate some of the prominent features of the exhibit:

Crompton & Knowles Loom Works, Worcester, Mass., exhibited two automatic weft replenishing drop box gingham looms, one being a four-color and one a two-color loom. Charles F. Hutchins was in charge of the exhibit.

The new construction of the weft replenishing device embodies simple and efficient means adapted to keep in practically continuous operation a loom weaving goods with filling of two or more colors, automatically changing the depleted bobbin just before the exhaustion of the filling and supplanting it with a filled one of the same color selected from the magazine.

The loom is equipped with a vertical stationary magazine or battery, holding in reserve, in vertical ways, the filled bobbins. Immediately in front of the magazine is a detector feeling through to the bobbin. While the bobbin retains sufficient quantity of filling, the feeler motion is inoperative; upon the near exhaustion of the filling, the feeler becomes operative, causing the indication for the initial movement of the bobbin from the magazine and then the displacing of the bobbin in the shuttle by a filled one of the corresponding color.

The various inventions embodied in the loom are so devised and constructed that the selecting from the magazine of other than the proper color required in the pattern being woven is impossible, as the mechanism controlling this selection is always in unison with the operating shuttle.

Mossberg Wrench Co., Central Falls, R. I., exhibited a number of its specialties, among the most interesting being the Sim-Pull and Sim-Plex countershafts and belt shifters. With these simple and effective devices, in order to shift the belt from the tight to the loose pulley, or vice versa, it is only necessary to pull the handle attached to the end of the

cord depending from the device. The Sim-Pull belt shifter is made in different sizes for shifting belts on driving pulleys, having faces varying in measurement from 1¾ to 2¾ inches, while the Sim-Plex may be used on pulleys varying in width of face from 3¼ to 6¼ inches.

National Brake and Clutch Co., 16 State St., Boston, Mass., manufacturers of "Cork Inserts," had a comprehensive exhibit, showing the application of cork inserts to textile machinery. Pamphlets and reports were distributed showing the wide application of cork inserts to the textile industry. One booklet illustrated 38 applications of cork inserts for textile mills, including loom frictions, mule frictions, spinning frames, fly frames with a special reference to the cone drives, etc.

The C. J. Root Co., Bristol, Conn., exhibited a complete line of their automatic counting machines, which are used for various purposes, on looms, folders, and various yardage machines, and also brass butts were shown in great variety and special patterns.

Dodge Mfg. Co., Mishawaka, Ind., with a branch office at 137-139 Purchase St., Boston, Mass., had a very unique exhibit showing a complete line of power transmission machinery, including hangers, pillow blocks and wood and iron pulleys, both solid and split. The entire exhibit was operated by an "American" system of rope drive, being purposely made complicated to show the merits of rope driving. Dodge split and solid clutches were located on the running shafting, and also seven different types of bearings were shown, all being fitted to the same hanger frame. An interesting part of the exhibit was the 46x15 iron center wood rim pulley that has the world's record for high rim speed, having run at 2,400 R.P.M., the rim traveling 28,889 feet per minute, or about 5⅜ miles. Positive shaft couplings of several designs were shown on the shaft, as well as other devices.

The American Teazer Cotton Gin Co., New York City, had one of its new roller "Teazer" cotton gins in operation. The gin is adapted to handle both Sea Island and Upland cotton, which is an excellent feature. The company claims that cotton, after having passed through the gin, is free from break or tear, thereby maintaining the natural length of fiber.

J. B. Ford Co., Wyandotte, Mich., manufacturers of the well-known Wyandotte Textile Soda, was represented at the exhibit, and distributed interesting literature on its products.

Walsh & Houston Mill Sewing Machine Co., 78 Butler St., Lawrence, Mass., had an exhibition of their simple and compact sewing machines for mill use. The head of the machine is securely bolted to the supporting column, and the base having three trucks (one swivel) permits easy movement from place to place. Attached to the arms of the pulley are slides operating pins through the rim. These pins are automatically pushed forward, securing the cloth and feeding it, and, as the pulley revolves, are gradually withdrawn. The looper is easily adjustable for wet or dry, and light or heavy cloth. There is no friction required to tighten the pin and feed pulley, as it is free to move in one direction.

W. T. Lane & Brother, Poughkeepsie, N. Y., manufacturers of the Lane patent steel frame canvas mill baskets, doffing boxes and trucks, had a most attractive exhibit of their different products, and pamphlets, with prices, etc., were distributed.

Henry L. Scott & Co., Providence, R. I., manufacturers of different yarn testing devices, exhibited the following machines: Yarn tester with automatic power attachment, English yarn tester which is operated by hand, 36-inch roving reel, twist counter, capacity 10 inches, yarn inspector, cloth tester, which has a capacity of 200 pounds.

The American Moistening Co., Boston, Mass., had a most complete, extensive and unique exhibition of humidification and moistening processes, in which all details were shown in a most attractive manner. A list of over 800 users had been prepared in a shape something like a Jacquard card pattern, so that the name of each user was automatically, separately and successively shown in front of an electric light with descriptive comments on the various types of apparatus. The name shown was changed automatically from time to time.

Cell Drier Machine Co., Taunton, Mass., showed a 30-cell drier equal in capacity to 60 cylinders. The machine was driven by a Reeves variable speed transmission. Large framed photographs of a dozen or more of the new type horizontal cell driers which the company built and installed in the past year were also exhibited.

Jenkins Brothers, 35 High St., Boston, Mass., had a nicely arranged exhibit showing their different types of valves for high and low pressure steam power plants, and also their 96 sheet packing. The firm of Jenkins Brothers has been established for some 45 years and their products are widely used.

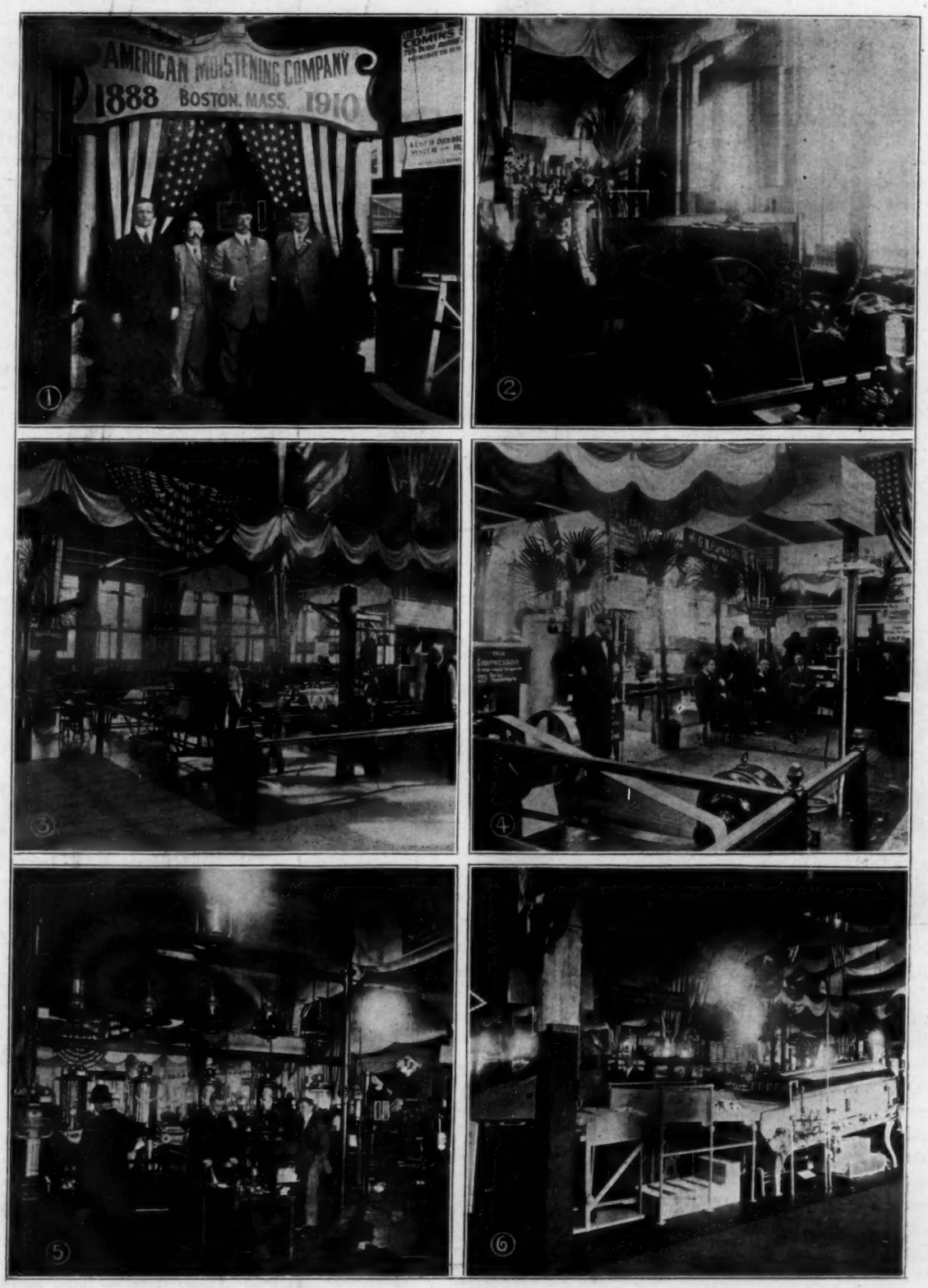
The Penn Metal Products Dept., 201 Devonshire St., Boston, Mass., representing the American Steel & Wire Co., had an exhibit of their Triangle Mesh Reinforcement, which is used in connection with reinforced concrete construction.

The Woonsocket Machine & Press Co., Woonsocket, R. I., exhibited one of their celebrated roving machines. The machine was a 7x3½x168-spindle fine frame fitted with all their latest improvements including ball-bearing top rolls, of which there are over one million in use, which shows the great success with which they are meeting. The frame was driven by a one-inch belt, showing the light-running qualities of the "Woonsocket" frame.

The American Warp-Drawing Machine Co., 289 A Street, Boston, Mass., exhibited two of their standard drawing-in machines, showing improvements that have been made during the last year. As they are constantly making improvements that broaden their field and give their customers better service, they had a number of interesting points. They also exhibited one of their new tubing machines for threading and trimming the yarn used in the manufacture of Axminster carpet. This is something entirely new in the field and is such a labor-saver that it is claimed to do away with 80 per cent. of the help, 80 per cent. of the floor room and 90 per cent. of the waste, besides turning out a superior product.

C. G. Sargent's Sons Corp., Graniteville, Mass., showed their model "M" Automatic Feed and their Amoskeag Yarn Conditioner Machine.

Holophane Co., 93 Broad St., Boston, Mass., originators of the Holophane system of illumination, exhibited an improved type of steel reflector for mill lighting. This reflector is its latest development in this particular line and embodies the latest features that can be applied to metal reflectors. It was shown how with the aid of this reflector it is possible to increase illumination upon the plane from 50 to 300 per cent. over that from a bare lamp, and from 25 to 50 per cent. over that given from a lamp with any




SOME EXHIBITS AT THE TEXTILE MANUFACTURERS' EXHIBITION, BOSTON, MASS.

1—American Moistening Co., Boston, Mass. 2.—American Cotton Teazer Gin Co., New York City. 3—Barber-Colman Co., Boston, Mass. 4—The G. M. Parks Co., Fitchburg, Mass. 5—Stuart W. Cramer, Charlotte, N. C. 6—C. G. Sargent's Sons, Graniteville, Mass.

other metal reflector. A comparative arrangement of lamp and reflector in connection with color values, was also shown to demonstrate the value of the system.

Birch Brothers, Somerville, Mass., exhibited a number of their patent devices, among them being Birch's Patent Improved Sewing Machine used for sewing the ends of gray cloth together, preparatory to singeing or bleaching. The machine dispenses with the small strippers, and this operation is accomplished by a more mechanical and positive means, and at the same time without the liability of breakage. The machine is fitted with trimming shears for reducing the overlap to a uniform width of 3/8 of an inch. Birch's patent "Coronation" rotary sewing machine was shown, this machine being especially designed for sewing in front of printing, napping, finishing, dyeing, washing, singeing, drying, and similar machines. It will sew any fabric of any thickness, whether wet or dry, and will produce a seam free from puckering. A running stitch is shown and it can easily be withdrawn from the cloth. The length of stitch can be changed from the smallest to a stitch one-half inch long. The treadle is placed in front of the machine, and after setting the latter in position to sew, the man can operate the machine without having to walk around to the treadle.

Exhibit of Birch Bros., Somerville, Mass.

Birch's Improved Excel Sewing Machine was also exhibited, being his latest invention in modern priced sewing machines. The special points of excellence claimed are extra heavy driving shafts, extra heavy needle bar, and extra long journals to allow for wear. Birch's latest improved adjustable spiral opening rollers were included in the exhibit, the function of which is to open and smooth out all crimps, creases and double edges, acting with perfect accuracy and delivering the fabric completely free from these objectionable features. The machine is designed for use in connection with drying machines, open washing and soaping machines, dyeing machines, ageing and steaming machines, mercerizing machines, water mangles, padding machines, calenders, etc. All kinds of material may be worked, such as duck, calico, silk, canton flannel, woolen and worsted, mosquito netting, etc.

Birch's improved angular guide was examined with interest by dyers and finishers. The machine as shown in the accompanying illustration constitutes angular guide rollers for guiding any class of fabrics centrally and opening and smoothing out crimps, creases and double edges. The guide dispenses with the necessity of an attendant for guiding the fabric in the desired path, and acts with perfect accuracy. The illustration shows the guide attached to a set of drying cylinders, but it may be used in connection with open washing and soaping machines, drying machines, ageing machines, shearing machines, water mangles, calenders, etc. As shown, the fabric is passed over the first and under the second rollers, but if it is desired to work on one side of the fabric only, the latter may be passed over or under both pairs of rollers. The machine is designed for working calico, silk, mosquito netting, duck, canton flannel, etc.

Wadsworth, Howland & Co., Inc., Paint and Varnish Makers and Lead Corroders, 82-84 Washington St., Boston, Mass., showed the wonderful possibilities of the original "Bay State" brick and cement coating for use on concrete, stucco, brick and wood. Although this coating has been on the market but a few years, it is already in great demand by the leading mills of the country, particularly at Fall River and New Bedford, Mass.

It protects concrete or stucco or brick from disintegration by dampness and is itself impervious to moisture. It becomes a part of these materials and will not chip, peel or flake off. It is therefore especially adapted for use in the drying and slasher rooms and in those parts of the mill where there is much dampness. For overhead work it is admirable, because it does not peel or flake off, which would cause dropping, and thus damage delicate machinery. It is also a fire retarder and has been endorsed by the National Board of Fire Underwriters as such. It has great elasticity and can be applied to wood with great facility. When rubbed down it gives a soft velvet effect.

One of the uses to which this coating has been put with much success is that of an interior finishing coat on concrete instead of the usual coat of plaster. Among the mills which have ordered it in large quantities in Fall River, are the Fall River Bleachery, Lincoln Mills, Stafford Mills, Conanicut Mills, Cornell Mills, Davis Mills, Bourne Mills, King Philip Mills and Arkwright Mills; in New Bedford, the Acushnet Mills.

S. F. Bowser & Co., Fort Wayne, Ind., manufacture a very complete line of oil storage systems, embracing almost every conceivable device, from simple storage tanks with pumps, to automatic self-measuring and self-closing registering measures and pumps. The exhibit showed tanks varying in size from 10 gallons to 120 gallons capacity, and pumps with maximum quantities of one pint to one gallon. These pumps may be adjusted to measure any desired quantities under these limits. There were also shown portable tanks for factory use, tanks with hood and roll tops, combination tank, pump and filter, centrifugal oil pump with automatic registering measure, long distance measuring pump, and various devices for facilitating handling and emptying oils, the whole showing the possibilities and development of this special line of work, to which this company have been devoting their entire attention for 25 years.

Some new and special styles of outfits shown this year were tanks varying in capacity from 20 to 65 gallons each with non-overflow pumps, designed especially for use in textile mills, but equally useful wherever there is an accumulation of lint or dust or wherever hand oilers are used. These pumps are so arranged that cans can be filled without overflowing, doing away with the necessity of wiping off the

can, and thus eliminating the dirt and danger from saturated waste, and making the handling of oil cans much cleaner than is possible in any other way. Drawings were also shown, illustrating some very large and elaborate equipments which have been placed in manufacturing establishments all over the United States and abroad. The company have offices located in many of the principal cities, and a very large manufacturing plant at Fort Wayne, Ind., and another in Toronto, Canada.

KEYSTONE LUBRICATING CO., Philadelphia, Pa., had an exhibit to show the visitors their method of lubrication of textile machinery. This comprised the lubrication of comb boxes on cards, combers, drawing, cylinder boxes on cards, top rolls on speeders, steel roll necks on speeders, top rolls on mules, beater boxes on pickers and shafting. Lubrication for reciprocating engines, condensers and pumps, was also shown.

MACRODI FIBER CO., Woonsocket, R. I., represented by S. T. Packard and H. D. Ballou, had an exhibit consisting of a complete line, showing the various styles and sizes of spools which it manufactures. The space was enclosed on the two sides and back with a solid framework covered with green burlap, on which the spools were arranged in various designs. As the spools were painted in different colors, the arrangement was a very striking one. In the center of the space were shown the various parts of the spool, and the method of construction employed. Among the spools were included both the large and small sizes of warp spools for cotton work, creel spools for carpet mills, and special sizes of spools for different processes both in cotton, worsted and silk.

The fiber used in the manufacture of the fiber heads is especially made for this particular work. It has no grain as has wood, and the fiber heads will consequently not chip, crack or break, neither will they rough up on the inside edge in the process of spooling. This is a very important feature. On account of the difference in thickness between the fiber heads and wooden heads, this difference can be added to the length of traverse. For instance, a wooden spool with 5 inches traverse is 6 inches over all. This company can furnish a spool 6 inches over all which has a 5½-inch traverse, which enables 10 per cent. more yarn to be wound on this spool than on the wooden spool of the same outside length.

LESTERSHIRE SPOOL & MFG. CO., Lestershire, N. Y., represented by G. E. Holmes, showed a complete line of their goods, including all kinds of spinning bobbins, both with metal tips and shields, plain wood, shellac and oil finish; card room bobbins, wired, plain and with metal shields in all kinds of finish; twister bobbins of solid maple, with dogwood heads and maple barrels, with metal caps and shields; lace spools of all kinds showing dogwood construction; all kinds of warper and twister spools, hard and soft wood. An especially interesting display of their patented metal-protected spool was made. The exhibit also contained a full line of worsted drawing spools, jack spools, and worsted filling bobbins.

THE TAVELLA SHUTTLELESS LOOM proved to be one of the highly interesting exhibits and worthy of special note for ingenuity of invention, simplicity of construction, wide range of work for which it is adapted and its shuttleless construction. While this loom retains the shuttleless features of the loom exhibited in 1909, it is in reality new.

The loom exhibited carried eight colors of filling, but it can be built for a greater number without extra cost. Each color as called for is brought into position by a pattern chain acting on the needle that carries such color, and if necessary to put two contrasting colors in the same shed, these can be laid side by side at one pick, so-called, instead of two by the old method of picking.

The loom has but one shaft, upon which are mounted the cams that actuate the latter. These cams are so timed that one-fourth of the revolution is consumed for the motion of the lay and changing of harness, the other three-fourths for the traveler to pass through the shed, get the filling and pull it through. This traveler receives its motion from a cam of particular construction set at the side of the loom. Being cam driven it is positive in action.

Being shuttleless there is no danger in starting or stopping the loom with the lay in any position. At no time can there be a smash caused by breaking of any part of the picking motion. It will run at any speed up to the limit, say 140 picks per minute. By changing one gear it lends itself to a change from cotton weave to four-harness twill or any weave of four picks to repeat. This alone suggests the variety of work that may be produced.

In short, it is a fancy loom with the shuttle boxes and picking motion eliminated.

C. R. JUDGE KNOT-TIER CO., Lowell, Mass., exhibited a new type of knot-tier for worsted, woolen and cotton. This device differs from other knot-tiers, as it is attached directly to the spooler or twister as the case may be, there being one knot-tier for every spindle. This knot-tier is without joints or movable parts, and without any cutting edges or other portions which are liable to require repairs. It consists essentially of a wire twisted into the proper shape with a hooked end. Six different knots may be tied with these devices. It is claimed that on a production of 10,000 pounds 2/20s worsted yarn, a saving of 4 pounds per week is effected, and therefore in 50 weeks in a year 200 pounds of 2/20s worsted yarn will be saved.

L. B. DOW, 176 Federal St., Boston, Mass., representing the Bogart Gas Power Engineering Co., Buffalo, N. Y., exhibited one of the Bogart gas engines. Producer gas is used for driving the engine and can be made from pea or buckwheat anthracite coal, certain grades of bituminous nut coal, coke, charcoal and lignite. It is stated that a producer plant utilizes about 72 per cent. of the fuel energy, while the steam plant gets only 65 per cent. The gas engine is said to transmit 20 to 30 per cent. of the energy in the gas supplied into useful work; the steam engine 6 to 12 per cent. of the energy in steam. With the gas engine, there is no cylinder head, only one gasket on the engine, positive cam-operated exhaust and inlet vertical poppet valves, and an improved magnetic-electric igniter operated electrically. The main advantage claimed is that the cost of power can be reduced from 25 to 60 per cent.

THE COOPER HEWITT ELECTRIC CO. exhibited various types of the mercury vapor lamps and had photographs of installations in different mills, showing not only the general illumination of the room, but the lighting effect on the detail work. In regard to the adaptability of the Cooper Hewitt light to textile work, its chief value lies in the fact that it not only gives a daylight condition after dark, but this condition is brought about by the use of a light which brings out the details of machinery, threads and all operations even more clearly than is accomplished in daylight.

The accuracy of vision under the Cooper Hewitt light

has been proved by test to be 33 1-3 per cent. better than by daylight. This test was made by having a great many operators attempt to count cotton threads of different sizes at different distances. The average of all these operators shows that, under a good north light condition, they could accurately distinguish the threads up to about 17 feet. Beyond that they began to make mistakes in counting. Under the Cooper Hewitt light this distance was increased to 24 8-10 feet. The investment in Cooper Hewitt lighting lies in the fact that a room properly lighted will increase the capacity of the mill, and also betters the quality of the work turned out.

Borne, Scrymser Co., the old established refiners of oil, exhibited on the main floor a complete display of textile oils, of which they make a specialty, as well as all grades of lubricating oils. For the woolen interests, the well-known brands of the "Breton" oils for wool, which have been on the market for over twenty-five years, were on view, with capable woolen men to explain and discuss the value and wisdom of choosing the special oil according to the particular work to be done. This includes the regular Breton oil, used in place of lard; saponified oil for wool, Breton brand, which is fast replacing Red Oil; and olive oil for wool, Breton brand, which is meeting all the requirements of olive oil. They have eliminated one bugbear of the mill, and that is the reduction of chance of spontaneous combustion to practically zero. Fires from this cause are unknown where Breton oils are used.

Their Paragon loom and knitting oils, well known both for high excellence of color and lubricating qualities, were shown. All of the grades are of the highest quality of their respective classes, as it is well known that with this company "high standard and uniform quality" comes first always.

They had a spindle oil for every class of spindle, Rabbeth, mule, woolen, etc., and for the mill that was partial to light-colored products, such an oil could be furnished by them. On lubricating oils—cylinder, engine, machine, etc.—their well-known products were shown, that have steadily increased in favor, due to merit alone. A most satisfying list of greases for all purposes completed an exhibition that showed the wide and exceptional facilities Borne, Scrymser Co. have for caring for every lubrication problem that meets a mill man.

Carbolineum Wood Preserving Co., 182 Franklin St., New York City, had a very interesting exhibit, showing by laboratory work that Avenarius Carbolineum was neither dangerous nor inflammable. Distillations were made for the purpose of showing that the material contained only such constituents as experience had taught will remain permanently in the wood.

Another feature of interest was the display of a large number of orders from textile manufacturers from the North and South. Several old specimens of preserved timbers as well as photographs were also shown. The exhibits clearly indicated that the textile industry is very much interested in the subject of preserving woodwork against rot and decay.

Cling-Surface Co., Buffalo, N. Y., showed by means of pulleys on carriages, brakes, and scales, how a belt properly filled with Cling-Surface could transmit double the load with the same sized belt running slack than could be transmitted by the same belt running tight. With all belts in a plant running slack, it is claimed that the friction could be cut down between 5 per cent. and 15 per cent. It is further stated that Cling-Surface filled belts never slip, and run as well in damp, muggy weather as in dry. It is also said to be an excellent preservative of leather and other fibers.

Dow Surgical Battery Co., 170-A Tremont St., Boston, Mass., representing the "Richmond" Sales Co., exhibited a number of devices used in connection with their storage batteries, one of the most important and interesting to textile men being the Richmond portable battery fan. The fan is made in either 9 or 12 inch sizes, and is the regulation electric fan fitted with a specially constructed motor which is simple in design and noiseless in operation. The portable battery for the 9-inch fan is enclosed in a porcelain jar. The battery and fan weigh only 25 lbs. and can therefore be easily moved from room to room and placed in any position desired.

This company also exhibited the Everett Change-Maker for use in mill offices for making up the pay-roll accurately and expeditiously. It makes change in a single operation from 1 cent to $1.99. It has 15 keys, a five-cent lever and a release lever. No subtraction is needed in making change. It is claimed to save 50 per cent. in time, and 100 per cent. in errors. Its operation being simple, it is said that a child can operate it. It occupies 12½ by 9 inches space and weighs 23 pounds. Some very interesting literature was distributed explaining this very practical Change-Maker.

Hussong Dyeing Machine Co., Groveville, N. J., manufacturers of the patented Hussong Dyeing Machine for dyeing slubbing, silk, worsted, woolen and cotton skein yarns, hosiery and raw stock and for bleaching, carbonizing, oxidizing and chroming, had a very interesting exhibit. Sample skeins of dyed yarns and manufactured materials were shown to emphasize the superiority of materials dyed by the Hussong method.

Arlington Machine Works, Arlington Heights, Mass., had on exhibition their well-known Arlington cloth opener and folder, which in the worsted and woolen mills picks up the cloth from the hydro-extractor, opens out the twist, and folds it neatly on trucks ready for the dryer and gigs. In cotton finishing plants, the machine picks up the cloth from the bins and delivers it direct to water mangles, drying machines or into trucks. This opener is used on silks, calicoes, ducks, canton flannels, twills, bunting, ginghams, madras shirtings, etc., also on ladies' fine dress goods, cloakings, men's wear, overcoatings, doeskins, kerseys, friezes, etc.

American Mason Safety Tread Co., Boston, Mass., had on exhibition their Karbolith flooring, sanitary base and wainscoting, which are well adapted for use in textile mills. Karbolith is a composition of chemicals, some of which are of a fibrous and cellular nature, which thus furnish a slightly elastic but hard and tough body. The cement bond employed unites the several ingredients into one solid body and at the same time produces a perfect bond with the base to which it is applied, whether the base be of concrete, wood, iron, or stone. The large percentage of magnesium compounds used in the composition makes the Karbolith absolutely fireproof, and the action upon it of intense heat even in the presence of carbonic acid and steam, affects only the surface and that to but a slight degree. It is unaffected by changes of temperature, as it is is a non-conductor of heat. There is no contraction or expansion produced by varying atmospheric conditions, yet its elasticity allows it to adapt itself to the expansion or contraction of any base upon which it may be bound, without injury to its surface.

# The Textile Mill Situation in the South and New England.

## SOUTHERN MILL SITUATION.

(*Special Correspondence.*)

Interest among mill men just now centers about the coming meeting in Charlotte on the 17th and 18th of the American Cotton Manufacturers' Association. Twelve hundred or more delegates are to be in attendance, and elaborate plans for their entertainment are under way. A lot of interest centers about the coming report of the Sales Note Committee. It will be recalled that some months ago the committee of the association having in charge the drafting of a uniform cotton sales note met in New York, and practically agreed upon a form to offer for adoption. The only objection at that time came from a contingent of converters who desired certain changes from the contract as drafted.

A former high official of the association had this to say relative to necessity of action on the part of the association in regard to the matter of regulating production of goods: "The proposition of adopting plans to regulate the production so as to correspond with the consumption of cotton cloth and yarns will be one to come before the association. This has been accomplished by every other industry in the United States, resulting from a demoralization similar to that which the cotton mills are now having. Spot cotton is now selling around 15 cents on account of the short crop, and has been since last October. Lowest quotations for the next crop are around 13 cents, and yet cotton goods have been selling recently in some cases on the perfectly ridiculous basis of 9 cent cotton on account of an over-supply and the pressing need of mills for funds. Fortunately individual curtailment has materially reduced the surplus on the market. The above experience makes it imperative that the cotton mills pursue the same methods now in operation by all other industries, and secure prices for cotton cloth and yarn based absolutely upon the cost of the raw material. This dearly bought experience will simplify and expedite the undertaking."

The action of the Attorney General in bringing about an investigation of an alleged cotton bull pool agreement and thus aiding the bears who had sold chalk cotton, created quite a stir in cotton circles. Almost without exception the manufacturers of the South have expressed resentment of this action on the part of the government. If the idea is to break up dealings in futures altogether, it is argued that the bears who have sought to depress the market by selling cotton they did not have should be brought to count. Numerous mill men have expressed their resentment of this attempt to artifically depress the price of raw cotton, at the expense of the South. When cotton on the New York exchange was selling considerably below spots in the South, numerous mill men bought there, expecting to have the goods delivered as agreed to in the contract. The interpretation of the recent action is that the bears, not having the cotton, in their dilemma appealed to the government, alleging an unlawful combination agreement between a party of bulls and mills. During the past week or two a strenuous effort has been made to buy a sufficient amount of cotton to meet the contracts, and the South has been ransacked for every available bale. The general opinion openly expressed is that the government has stepped in to aid one clique which is fighting another in a dilemma of its own making.

Capt. E. A. Smyth, of Greenville, S. C., said: "I understood that members of New York exchange when they testified before the Congressional committee said all sales on the exchange were to be for delivery of actual cotton, and that the exchange stood to see that all cotton sold by its members was delivered. Some time ago New York exchange depressed the price of contracts in New York far below a parity with the value of spots in the South, and mills needing cotton felt they could buy these contracts cheaper than they could buy spots in the South. One object was to get cheap cotton. Another was to stimulate price of cotton goods. It appears that some dealers who sold what they did not have are appealing to the government for relief from filling contracts with the mills."

J. M. Greer, of Ensley Mills, said: "I think it outrageous that the government should go in league with the bears, or with either side for that." Conference of manufacturers of Greenville, S. C., section was held and while no statement was made the attitude of the government was considered unwarranted. Some of local mill men are reticent about talking before they understand the situation more fully, but many agree with Pres. Lewis W. Parker in censuring the government for taking sides with the bears.

R. M. Miller, Jr., ex-president of the American Cotton Manufacturers' Association, and president of the North Carolina association, made this statement: "To my mind the question is not one of speculation, but a great commercial principle is involved, namely, the legitimate use of an exchange for the buying and selling of a commodity. In this particular case it looks to the layman as if some of the bears on cotton in New York have sold themselves into a hole and now, like the traditional pig, are squealing because they can not get out. It will be recalled by all interested that only a few months ago during the hearing at Washington in the investigation of methods of the New York cotton exchange, every member at the exchange in his testimony under oath, swore that the New York exchange was the legitimate exchange for the buying and selling of actual cotton.

"Now as I understand the present situation, it is that a number of cotton manufacturers and their associates have bought contracts on the exchange at this time because it was cheaper than they could buy it in the South, and will demand delivery of actual cotton for actual consumption, and will not accept chalk cotton of this exchange. The bear element sold this cotton with the hope of gain, but it appears now that they can not deliver except at a loss, and so they have appealed to the United States to relieve them of a bona fide contract. If they can do this act and accomplish their purpose, then the use of the exchange is not legitimate. I do not take issue with the speculator or anti-speculator. As I understand the present proposition it is not a matter of present speculation on the part

of buyers of cotton but, to the contrary, it was bought because it was cheaper than it could be bought elsewhere, and for the purpose of actual consumption. This being true their contention is absolutely right to demand what they have bought and no law on earth should be invoked to deprive them of their rights. The American public despises a squealer or a quitter, but are proud of the brave men who always believe in fair play, and common honor and justice among men."

CURTAILMENT IN THE SOUTH.

Curtailment is unquestionably the heaviest at this time in the history of cotton manufacturing in the South. However, in the opinion of many well known mill authorities, the story sent out by the Associated Press, based on statistics compiled by a Northern paper, are greatly exaggerated. For instance, Virginia is quoted as 60 per cent. of the machinery being idle, whereas the Dan River Mills, which alone compose over 60 per cent. of the spindleage of Virginia, are running full time. A conservative estimate of curtailment in cloth and yarn mills of the South at present is 25 per cent., bulk being among yarn mills. Curtailment will undoubtedly continue until such time as mills can get a fair margin of profit. Present prices are on the basis of 11 cent cotton while actual raw material costs 15 cents. Many mills would extend curtailment even further but for the fact that they do not wish to sacrifice their organization.

Stocks of goods are of considerable volume, but not nearly as large as was generally supposed. There is no doubt that considerable export goods have been sold recently, and as further evidence of this fact it is cited that the Pacolet Mills, Pacolet, S. C., which cater to export trade exclusively, have resumed full operations after a long period of short time running. It is also known that J. W. Cannon, who controls the towel market, has removed his large accumulation, which were stored at Kannapolis, N. C. It is also known that a large number of small mills have sold the bulk of their stock of goods and yarns within the last two weeks. Prices at which they were moved were very low, but the fact that sales have been made seems to indicate that the bottom has been reached, and that some improvement may be expected. North Carolina is curtailing more heavily than any other Southern State, but a fair estimate places curtailment at not over one-third. The bulk of mills in Charlotte, N. C., are curtailing; some are running four days a week and some only five. However, curtailment is principally confined to smaller mills, and yarn mills especially. The big mills of South Carolina, at Greenville, Columbia and Spartanburg, are said to be running regularly. One of the best known cloth manufacturers of the South, and a former official of the American Cotton Manufacturers' Association, stated that if any cloth mills of any consequence are curtailing, he does not know of them. Also, that old stock of export goods, which had accumulated during the panic two years ago, have been disposed of, and export mills now have practically no accumulation. In fact, mills in the Carolinas have 15,000 bales or more to be made up for export. Many of the mills reported two weeks ago to have gone on short time have gone back to full operations, and curtailment at present is by no means as great as reported.

## NEW ENGLAND MILL SITUATION.

*(Special Correspondence.)*

New England cotton manufacturers are making a brave effort to assist the laws of supply and demand in establishing a profitable market for textile products. There is a sincere effort to curtail production in lines that appear over-stocked or that are quoted at unreasonably low prices, and the effect of this action is already being recognized as one of the most important contemporary market factors. In New Bedford, there is a total curtailment on fine goods, that are not meeting with a favorable market, of close to 24 per cent., according to a prominent cotton mill treasurer in that city, in a statement to the Associated Press. The new mills have not started up all of the machinery which is ready to operate, and such prominent mills as Dartmouth and Pierce are reporting idle machinery.

The textile market is in a depressed condition; but there are a great many favorable signs that manufacturers deem powerfully important. There is not the general feeling of pessimism that existed during March and April when goods would not sell at reduced prices, and inquiries were almost an unknown quantity. To-day, there are plenty of inquiries and bids for large amounts just under the market. There appears to be a stronger feeling of co-operation between selling house and manufacturer; in fact, one of the largest selling houses in Boston has adopted the unique plan of having the selling representative of a particular line spend two days a week at the mill so as to become familiar with the costs of fabrics and the manufacturing end.

There has always been a barrier between the manufacturer and the salesman during periods of unprofitable manufacturing because the selling man insisted upon doing business at some price while the manufacturer paid the penalty by seeing goods manufactured and sold at a loss. This condition appears to be disappearing and is being relegated to the ancient history of the textile industry. Co-operation and community of interests is a financial and economic development of the contemporary textile situation.

The export market continues quiet with total sales this year about 15 per cent. under the same period during 1909. The Pepperell Mills have sold over 1,000 bales of drills to India at 7 3/4 cents, and there are a number of larger orders for these goods to be placed the first of May at the same price. Pepperell drills have enjoyed a very healthy market since the first of the year. The demand from China is very quiet with a few offers for moderate size quantities of standard sheetings at a small fraction under the market. There is more interest in 3.50 than 3-yard sheetings at this time, Chinamen state. The South American trade for ginghams and tickings is slightly improved at the reduced prices. Bliss, Fabyan & Co., have exported to South America more tickings the past month than during January and February, that is on new business. The Manilla trade is excellent, and New York exporters are making plans for the broad development of this market.

The Draper Co. recommends the present time, when there is so much idle machinery, for mills considering the installation of new machinery and the replacement of old machinery, to make the necessary changes. The trouble and expense of making such changes is now at a minimum,

the Draper Co. states. This company reports a fair market for its wares and is anticipating a material improvement in the fall. A representative of this concern states that he believes 1911 will be the banner year in the textile industry. Other loom builders report a few new orders but not sufficient to operate their plants at full capacity. Mill supply houses report the dullest market in five years. Belting makers are busy on orders for general manufacturing plants; but are getting very few orders from the textile industry. In brief, industries allied to the textile are unanimous in reporting a narrow market with very few new orders.

By far the most important development in the raw cotton market during the past month was the initiation of Federal investigation of the exchanges and pools interested in the staple. There is no doubt but that the Western pool, with millions of dollars and courage, were planning a big uplift in May option and spot cotton; but the action of the Federal government has placed a decided damper on such plans. Just how far the investigation will go and what the result will be is extremely difficult to prognosticate at this time. Spinners feel hopeful that it will have a depressing effect on spot and future quotations.

Many fine goods and colored goods mills in this group of States have found it more profitable to buy yarns than to manufacture them, hence curtailment has resulted. The Boston Mfg. Co., at Waltham, Mass., is operating practically full time on orders in all departments except the finer counts of yarns which can be purchased in the open market at a price considerably below actual cost of manuture. Two Lawrence and four Maine mills have taken similar action. Fall River mills are continuing the curtailment agreement. Mills operating on ducks, drills and coarse goods are curtailing from 20 to 50 per cent. Boston selling houses are more hopeful than at any time since the turn of the new year, and many are frank to state that buyers are getting very uneasy. Business among the retailers in New England has been heavy since spring opened up and their stocks are getting very low. Summer merchandise is being taken in large volumes. Printed wash goods such as light percales and batistes are moving freely while the market for dress ginghams is firm in every department.

In the list of textile mill shares there have been a few notable declines such as 24 points in Lancaster Mills and 10 points in Bates Co. Both of these mills are making large capital expenditures, and it would not be surprising if further price concessions were noted. In New England, cotton mill shares are held by strong hands, and there is little real liquidation at the present time. For this reason the general market will probably hold firm throughout the depression. Fall River shares have weakened in bid and asked prices, but sales appear to hold at satisfactory prices. In New Bedford, there are very few shares offered, and buyers are unwilling to bid for lots. The textile mill share market as a whole is behaving very well in view of the condition of the industry.

# MARKET REVIEWS.

## MONTHLY REVIEW OF THE COTTON MARKET.

BY H. & B. BEER, NEW ORLEANS.

As we remarked in our review last month, the new crop outlook at that time, with the exception of a few minor complaints, such as the need of rain in Texas and east of the Mississippi River, which wants have subsequently been satisfied, was never more promising. To-day the situation is just the reverse, we are very sorry to have to report. Never was the crop promise more satisfactory than at close of the third week in April. The drouth in Texas had been broken at the opening of April, and the needed rains were had in the lower Mississippi Valley and South Atlantic States, fair favorable warm weather following in the wake of the rains which permitted the resumption of farm work all over the South, and until a few weeks ago, planting was further advanced than ever before for this time of the year. It was finished in the southern half of the belt and was nearing completion in the northern half of the cotton region, except in Arkansas and Oklahoma where it is usually late before much cotton is put in the ground.

We had occasion to comment on the favorable prospects for the new crop only a few days before the killing frosts, but the situation to-day has taken on a different aspect, the favorable outlook having changed to one of much distress. On the 24th, 25th and 26th of April an unusually cold wave from the Middle West invaded the Southern States, temperatures having been so low—at or below the freezing point almost to the Gulf coast—that all weather bureau records for cold weather at this time of the season were broken. Snow was reported on the morning of April 25th from northern and eastern Arkansas, Tennessee, portions of Mississippi, northern and central Alabama, and northern Georgia, while heavy and killing frost occurred southward into the central portions of Texas and Louisiana, and eastward to the Carolinas, which, with the exception of south Texas, covers the entire cotton belt.

The change from an early and good start to a late and uncertain one has been so sudden that the trade has yet to realize the enormity of the situation. According to reports the States of Georgia, Alabama, Mississippi, Louisiana and Tennessee have suffered the greatest disaster in an agricultural way than ever before at this time of the year, and the border States, the Carolinas, Arkansas, Oklahoma and Texas have not fared much better with the exception of the southern Texas which section escaped the cold wave. There is ample time to replant cotton and make a good crop if favorable weather is had during the month of May, but as the rainfall is usually the heaviest of the year during this month, it is possible and more than probable that bad weather will interfere with planting operations and cultivating what little cotton that may have lived through the cold spell. At the moment the situation is one of much uncertainty, and the original increase in the acreage, probably 5 per cent. or more, may be lost as seed is reported to be scarce and dear for replanting, having advanced from about $30 to $50 per ton in anticipation of an urgent demand. Therefore, in so far as prospects for the new crop are concerned, the situation at the moment is critical, but it is hoped that the elements will work

more favorably for the making of a good crop during the balance of the season.

As to trade conditions, there seems to be no material change. In America business in textile goods remains unsatisfactory owing to the high cost of the raw material and the comparatively low level at which goods have to be sold. In England trade advices are rather good, due, perhaps, to low wages in the British spinning districts compared to the pay demanded by American operatives. There is more or less curtailment being resorted to, however, all over the world, and the recent big Alabama spot failure, liabilities estimated at about $6,000,000, is likely to upset business across the water where the burden of the loss is located. Nevertheless, the world's visible supply will have been reduced by the end of this season, and as so much depends upon the outlook for the new crop, the future of market remains uncertain.

## THE YARN MARKET.

A review of the operations in the yarn market for the past month would indicate that conditions are little changed from those noted for the past several months. The figures given out showing the extent of curtailment by yarn mills prompted more inquiries from buyers, but the sum total of business eventuating was small. While there is no discounting the fact that increasing and continued curtailment will eventually have a decided influence upon prices, yet at the present time there seem to be two distinct influences that have acted to retard any betterment in prices. It was mentioned in last month's review that spinners had been storing their yarns instead of consigning them, hoping for a better market in the near future. The anticipated improvement did not occur, and some of this yarn had to be moved for what it would bring. The consequence has been that although the stock yarns in dealers' hands have decreased almost to the point of obliteration, the yarn in the hands of spinners constitute a similar deterring factor for higher yarn prices.

The other important point is the lack of demand from the buyers. The extremely low prices of yarns were acknowledged on all sides by buyers, as it is well known that current quotations were practically those based on 10 cent cotton. However, the buyers were not in a position to take advantage of the low range of prices, which many think will be the lowest reached this year, as their demands did not justify extensive purchases, and they were not inclined to take any speculative chances in the market.

The hand-to-mouth policy for the last two or three months has convinced the sellers that buyers' stocks are gradually being depleted. The increased number of inquiries during the first part of the month would seem to substantiate this belief, and at that time the result was that in a number of instances the offers made were declined, which would undoubtedly have been accepted two or three weeks previously by sellers. During the middle of the month buyers were looking forward to the possible effect of crop news, and were making tentative offers in some instances, with regard to delivery in new crop months.

Although the volume of business was small, yet it was noticeable that large variations in prices was not in evidence, and the market was less irregular than for some time. There were, however, exceptions, especially in the case of stock yarns which could be bought at concessions from prices asked by spinners.

While spinners have been firm in their demands for better prices, the market turned somewhat lower during the last of the month, due no doubt to the yarns on hand that were pressed for sale. Until the supplies in spinners' hands are exhausted, it is highly probable that more or less irregularity will occur. The extent of the accumulation in spinners' hands is not accurately known, but it is admitted that the operations of the last few months by the majority of spinners have been more or less continuous, in some instances the mills running at night. The accumulations of this production have not been distributed, and they must naturally be absorbed sooner or later at some price. The requirements of the buyers are so small that they can afford to wait for the distressed yarn and secure it at their own figures. Under the above conditions sales of 4,000 or 5,000 poonds were rarities, and inquiry for 10 bales of 2/30s skeins at the end of the month attracted considerable attention.

The following quotations prevailed at the end of the month:

### SOUTHERN SINGLE SKEINS

| | | | | | |
|---|---|---|---|---|---|
| 4s to 8s | 19 | @20 | 22s | 22 | @22½ |
| 10s to 12s | 20 | @20¼ | 26s | 22½ | @23 |
| 14s to 16s | 20 | @21 | 30s | 23½ | @24 |
| 20s | 21 | @21½ | | | |

### SOUTHERN TWO-PLY SKEINS

| | | | | | |
|---|---|---|---|---|---|
| 4s to 8s | 19 | @20¼ | 36s | 29 | @... |
| 10s to 12s | 20 | @20½ | 40s | 29 | @30 |
| 14s | 20¼ | @20¾ | 50s | 34 | @35 |
| 16s | 20½ | @21 | 60s | 40 | @41 |
| 20s | 21 | @21½ | 3-ply 8s upholstery | 20¼ | @... |
| 24s | 22 | @22½ | | | |
| 26s | 22½ | @23 | 4-ply 8s upholstery | 20½ | @... |
| 30s | 23½ | @24 | | | |

### SOUTHERN SINGLE CHAIN WARPS

| | | | | | |
|---|---|---|---|---|---|
| 8s to 10s | 19½ | @20¼ | 22s | 21 | @21½ |
| 12s | 20 | @20½ | 24s | 22½ | @23 |
| 14s | 20 | @20½ | 26s | 23½ | @24 |
| 16s | 21 | @21¼ | 30s | 24 | @24½ |
| 20s | 21 | @21½ | 40s | 31 | @31½ |

### SOUTHERN TWO-PLY CHAIN WARPS, ETC.

| | | | | | |
|---|---|---|---|---|---|
| 8s to 10s | 19½ | @20 | 26s | 23 | @23½ |
| 12s to 14s | 21 | @21½ | 30s | 24 | @24½ |
| 16s | 21½ | @22 | 40s | 31 | @32 |
| 20s | 22 | @22½ | 50s | 35 | @35½ |
| 24s | 22½ | @23 | | | |

### SOUTHERN PEELER FRAME CONES

| | | | | | |
|---|---|---|---|---|---|
| 10s | 20¼ | @... | 20s | 22 | @22¼ |
| 11s | 20½ | @... | 22s | 23½ | @... |
| 12s | 20¾ | @... | 24s | 23 | @... |
| 14s | 21 | @... | 26s | 23 | @23½ |
| 16s | 21¼ | @... | 28s | 24 | @24½ |
| 18s | 21½ | @... | 30s | 24½ | @24½ |

## THE KNIT GOODS MARKET.

The show of activity in the knit goods market recorded in last month's review proved to be very short lived, and during the month of April this division of the market was very quiet.

During the first part of the month a number of buyers were in New York making inquiries in the hosiery division, but the resulting business did not warrant the previous opinions and anticipations held by the sellers. The departure of the buyers left the market very quiet and dull. The continued lack of business found sellers complaining of an insufficient number of orders for their products. While it is true that prices were held firm with practically no reductions in any department, the sellers maintain that with current prices of raw stuff and yarns, it would be folly for them to make any concessions on the low prices prevailing, as it would mean a loss on every sale. It is an open question as to the actual position of the jobbers, and

there are many opinions as to the condition of jobbers' stocks. It is claimed by some that their shelves contain very little of fall line goods, while others are of the opinion that the jobbers are well supplied in this respect. Granting that jobbers have very small stock of fall goods on hand, it seems reasonable to suppose that owing to the present unsettled conditions, that they are in no hurry to place their orders.

One fact that would seem to have a retarding influence upon the purchases by the buyers, is that knit goods were bought heavily by the jobbers, but the retail dealers have not had a very good business this Spring and the presumption is that the jobbers have a good portion of these Spring goods on hand.

For this time of the year cotton hosiery for fall delivery is not as active as usual, and especially is this so in the East, where buyers are not taking the usual interest in the heavier weights. A few buyers think, owing to the general unsettled condition in the raw material market, it will be possible to purchase hosiery at somewhat lower prices than current quotations, but the majority of sellers are of the opinion that prices on standard hosiery are as low as they will go, unless there is a decided downward movement in the price of cotton. It is reported that the majority of the mills are well supplied with current orders, but the fall business is slow. It should be understood of course that all buyers are not remaining out of the market, but there are a number of them who are making no purchases, as to make the business very dull.

The outlook for duplicate Fall business was somewhat brighter during the middle of the month, owing to the reports from the West, where jobbers have had very fair advance sales for Fall deliveries. The Spring duplicate business is naturally very small in volume owing to the heavy orders placed at the beginning of the season, and the small demand from the trade. While it is true that the month of April is between seasons, when very little business is put through, at the same time the dullness may be partially attributed to the fact that the buyers are playing a waiting game, in the hope of satisfying their needs at prices below current quotations. All things considered, it would seem that conditions confronting the market are apt to continue possibly another month or six weeks.

# COTTON MANUFACTURING

## COTTON COMBING.

*(Contributed excluisevly to* COTTON.*)*

BY H. C. W.

PART II.

### 2. NIPPING.

After the required amount of lap has been fed forward by the feed rolls it passes between the cushion plate Q and nipper knife S, which are shown in Fig. 6. The nipper knife S then descends upon the stock and holds or nips the fibers firmly, preparatory to combing with the half lap on the revolving cylinder. The nipper knife S has a slot at its lower end which is filled with a hard fibrous packing A which when forced down upon the rounded edge of the cushion plate Q, holds the cotton firmly while the needles of the half lap pass through the front portion of the fibers. The cushion plate Q can be adjusted by the two screws B which are located side by side. This means of adjustment allows the edge of the cushion plate to be set at the proper distance to the blade of the nipper knife.

The setting of the cushion plate to the fibrous packing so that it will bear evenly, is made by filing the bracket C holding the cushion plate or by adjusting the knife. The cushion plate is held rigidly in place by means of two screws which bear against the nipper bracket stands. By holding the cushion plate rigid the feed rolls JK can be set closer to the bite of the nipper knife, allowing short stapled cottons to be combed. It also reduces vibration and contributes towards making a smooth, easy running machine.

The nipper knife is raised and lowered by means of the nipper cam D on the cam shaft E which is located under the front table of the machine. The nipper cam is so designed that for every revolution of the cam, the nipper is raised and lowered twice. Then if a comber is running

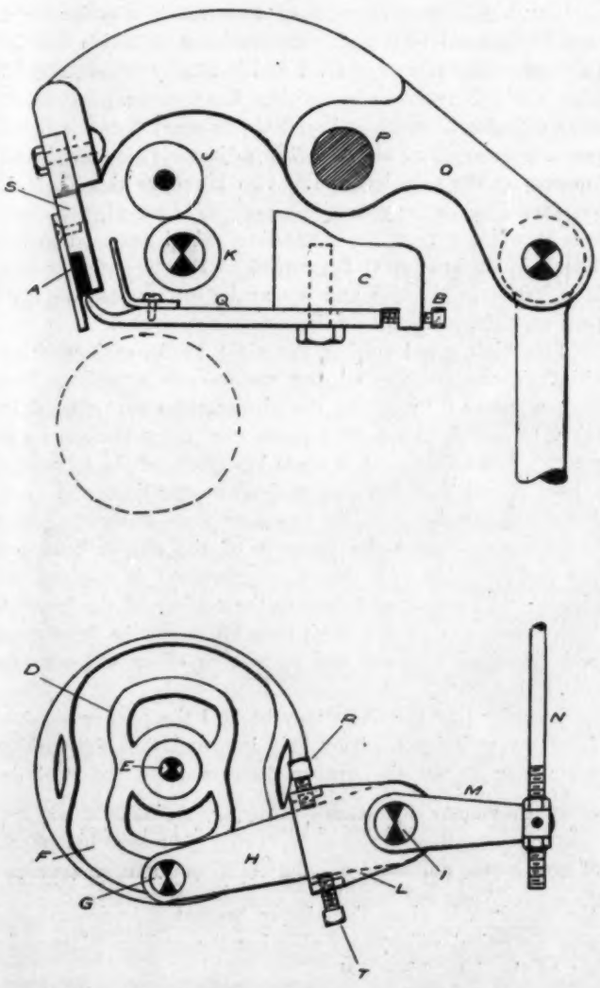



FIG. 6. DETAIL OF THE NIPPING MECHANISM.

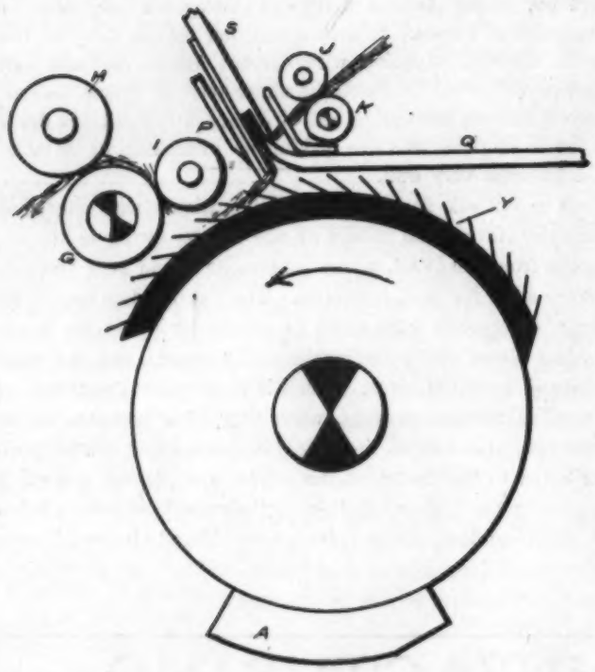



Fig. 7. Operation of Combing by the Half Lap.

130 nips per minute, which is a common speed, the cam shaft revolves only 65 times per minute.

Running in the groove F of this cam is a collar on a stud G fastened to the nipper cam lever H which has its fulcrum on the nipper shaft I and is loosely collared on it. This shaft I receives its motion from the nipper shaft lever adjuster L which is keyed to the shaft I and is fitted over the lever H as shown. The adjuster L is raised and lowered by the cam lever H. Also keyed to this shaft I, but extending in the opposite direction, is the nipper shaft arm M which carries the connecting rod N fastened to the nipper knife bracket O fulcrumed at P. The nipper cam D is bolted to a sleeve and it may be set to close the nippers at different times as the case may require.

This high speed comber has eight heads, each working alike. There are two nipper cams, each actuating four nipper knives. In setting the nipper cams care should be taken to have both sets of nippers start up at the same moment. This adjustment is made by means of the adjusting screws R and T in the nipper shaft lever adjuster L. Adjustments are also made by means of these screws to either increase or decrease the pressure of the nipper knife on the cushion plate. If too much pressure is applied the nippers will pound and destroy the setting of the bracket. If too little pressure is used, long fibers will be drawn out and discarded as waste and an uneven sliver will also result.

In order that the fibers may be held the proper distance from the cylinder comb or half lap, and that the cushion plate may be set the proper distance from the steel detaching roll to make a good piecing, the stands holding the nipper, brackets are adjustable in two ways. First, they may be raised or lowered on the incline of the intermediate stand by loosening the bolt and raising or lowering the stand; this gives the nipper bracket a horizontal and also a vertical adjustment allowing the cushion plate to be set to the detatching roll.

Second, a vertical adjustment can be obtained by an adjusting screw at the top of the bracket, which raises or lowers the nipper bracket hanger thus raising or lowering the cushion plate. In setting the cushion plate both adjustments should be made at the same time as any adjustment in one direction influences the adjustment in the other.

### 3. Combing With the Half Lap.

The fibers while being held by the nipper and cushion plate are ready to be subjected to the first actual combing operation. This is accomplished by means of the combs in the half lap located on the cylinder under the cushion plate. The combs of the half lap pass through the ends of the fibers projecting from the nipper, thus combing out all fibers not held by the nippers.

The half lap is made up of 20 combs or rows of needles as shown in Fig. 7, set into brass foundations each successive comb to strike the fibers containing more needles per inch than the preceding comb. The first row contains about 54 needles to the inch, and the last row about 86 needles to the inch. These needles are set at an angle which tends to draw the fibers operated upon deeper and deeper into them as they revolve.

Fig. 7 shows the position of the nipper S and cushion plate Q, while the combs of the half lap Y are passing

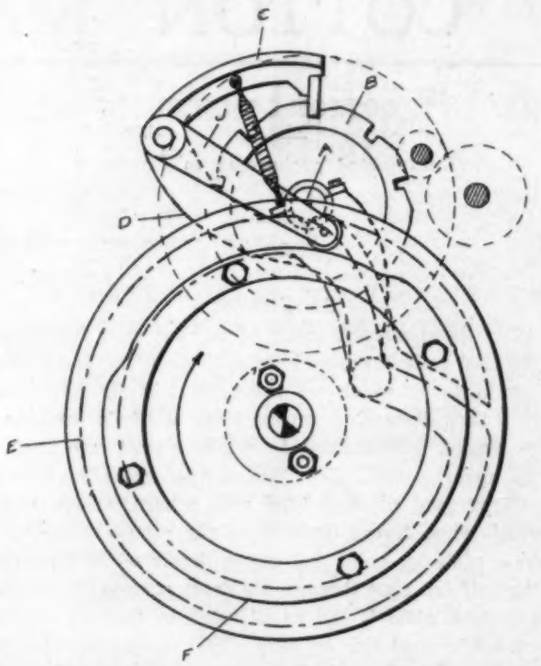



Fig. 8. Mechanism for Returning Back Some Combed Stock.

through the fibers. The needles have a slightly smaller radius than the segment A and this fact will explain why the detaching roll I is clear of the needles as they revolve and yet is raised and lowered by the segment. The needles of the half lap should be kept in good condition and not be allowed to become clogged with waste. They should be looked over once a month and all bent needles picked up.

### 4. Delivering Back Previously Combed Stock.

After the fibers under operation have been combed by the half lap, a portion of the stock previously combed must be delivered back in order to effect a piecing of the fibers just combed. This is accomplished by the backward revolution of the detaching rolls H and G.

Fig. 8 shows the method of actuating the rolls for the return movement. The combined motion is known as the notched wheel motion and consists of a notched wheel shaft, carrying two notched wheels, an internal gear meshed with a pinion gear on the end of the steel detaching roll pawl lifting cam and a detaching cam. The notched wheel shaft A receives its motion through the notched wheels B from the pawl arms C which have their fulcrums on the notched wheel shaft A. The pawl arms C are given a backward and

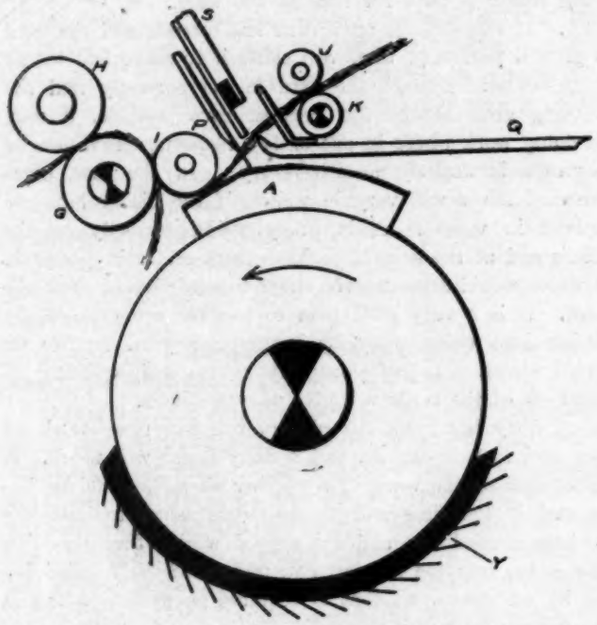



FIG. 9. POSITION OF THE PARTS READY FOR DETACHING.

forward movement through the lever D fulcrumed at A from the detaching cam E. Bolted to this detaching cam E is the pawl lifting cam F which through the lever J lifts the pawl C in and out of the teeth of the notched wheel B.

At the proper time the pawl C is dropped into a tooth of the notched wheel and the action of the cam E on the lever D gives the notched wheel and consequently the shaft A, a slight return movement which through the gearing operates the detaching rolls. Fig. 8 shows the cams and pawl in the position they occupy after the return movement of the detaching roll has been completed and the roll is about to receive its forward or delivering motion. Fig. 9 shows the position of the cylinder and nipper and also the previously combed stock which has been delivered back ready to have the newly combed fibers detached from the lap and pieced on the previously combed fibers.

The notched wheel shaft receives motion from two different notched wheel motions which work alternately, thus giving two actuations to the detaching roll for every revolution of the cam shaft. This is necessary, because the cam shaft makes one revolution while the cylinder makes two. The actuating cams are bolted to a sleeve keyed to the cam shaft and are adjustable by means of the bolts A to vary the time at which the notched wheel moves forward.

The pawl lifting cam F is bolted to the detaching cam E and is adjustable by the bolts B to allow the pawl J to drop into the notched wheel at the right moment. Unless these motions are properly set and timed an unnecessary amount of vibration is produced. The rattling noise often heard at the head of a comber is usually caused by a poor timing of the notched wheel motion. This can be overcome by resetting.

5. DETACHING AND DRAWING THE FIBER THROUGH THE TOP COMB.

The next operation is the detaching of the partially combed fibers from the nipper and drawing that portion of the fibers, which have been held between the nipper knife and cushion plate, through the top comb which removes all of the fibers which are not held between the leather detaching roll and segment of the cylinder.

After the half lap has passed through the fibers, the nipper knife is raised and the revolving cylinder brings the segment under the cushion plate. The segment has a short bevel at the front side which is used to give a gradual rise to the leather detaching roll, lifting the roll from its bearings and allowing the full weight to come on the segment, which gives the roll a firm grip on the ends of the fibers and prevents the leather detaching roll from slipping. The bevel on the segment, which gives the roll a firm grip on the ends of the fibers and prevents the leather detaching roll from slipping. The bevel on the segment also carries the ends of the newly combed fibers over so that they may be pinched between the segment and leather detaching roll.

Just as the fibers begin to be carried forward in this manner, the top comb descends into the fibers. The method by which the top comb is actuated is shown in Fig. 10. Located on the cylinder shaft A is a cam B having a ball C on a lever D resting on the top side of the cam. The lever D is adjustably secured to a shaft E to which is also secured an arm F carrying the top comb bracket G at its outer end.

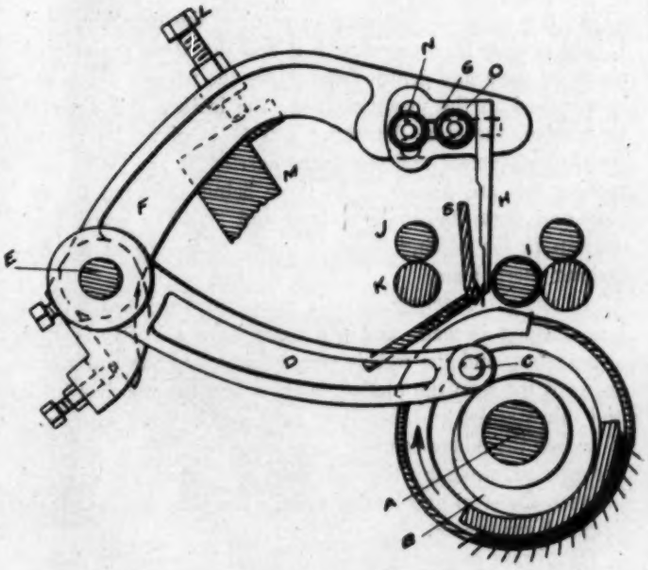



FIG. 10. MECHANISM FOR ACTUATING THE TOP COMB.

The top comb H is positioned between the nipper S and the leather detaching roll I as shown. Through the rigid connections explained the top comb is raised and lowered by the revolution of the cam B. When the ball C is resting on the shortest radius of the cam as shown in the drawing, the top comb is in its lowest position, where it exerts a combing action on the rear ends of the fibers. From this lowest point the outline of the cam raises the ball C and

consequently the top comb until it is entirely free from contact with the stock and allows the other operations to take place.

In order to keep the comb parallel with the plane of the stock under operation, two set screws L are used, one on each of the arms F holding the comb bracket—which project through said arm F and rest on the framing M of the machine. This arrangement also limits definitely the downward movement of the top comb. The angle of setting for the top comb may be adjusted by the bolts N and O as shown.

6. Attaching and Delivering the Finished Product.

At the time the leather detaching roll I is raised from its bearings and is in contact with the segment as shown in Fig. 9, steel detaching roll G is given its return forward movement, delivering forward the stock previously fed back, to which has been pieced the newly combed fibers.

The forward movement of the detaching roll is obtained through the notched wheel motion from the detaching cam, as shown in Fig. 8, which continues to revolve in the direction shown by the arrow. The cam E is so constructed that the forward revolution of the steel detaching roll G is enough greater than the backward revolution to deliver a length of fiber as long as that which has been combed. The attaching operation itself is accomplished by means of the leather detaching roll I.

This roll is constantly held against the steel detaching roll G by weights. The rolls are carried by two adjustable blocks which hold the roll up, out of the path of the cylinder needles. The segment, having a larger radius than the half lap, raises the detaching roll I from its bearings and forms a pressing contact which grasps the fibers that have been brought into nearly horizontal position by the segment.

As the segment continues to revolve, the detaching roll I, held against it, revolves with it and the fibers are carried along by them and drawn from under the nipper which has been raised in the meantime. As the leather roll I starts to revolve, the steel detaching roll G is given its return forward movement and the fibers, carried by the leather detaching roll are pieced on to those being delivered by the steel and brass detaching rolls G and H. The amount of overlap in the piecing depends upon the timing of the detaching mechanism.

If the steel detaching roll starts forward too late, a long piecing is made and the fibers have a knotty, curled appearance, and the web is very cloudy. If the roll starts forward too soon the piecing is short and the web has thick and thin streaks, and the sliver produced is cut.

After the newly combed fibers have been pieced on, they are carried along by the old fibers until they are grasped between the steel and leather rolls, when they continue their forward movement.

The brass detaching or clearing roll H is used to deliver the united fibers or web to the front pan where they are drawn through a trumpet by calender rolls and fed onto the sliver table.

The slivers from the eight heads are drawn along the table, the ends uniting to form a single sheet. They then pass through the draw box, consisting of 4 pairs of drawing rolls, and the sliver is passed through a coiler and wound into a can. The draw box is nothing more than a single drawing process and has a draft usually of about 5.4.

*(To be Continued.)*

## CARD ROOM QUESTIONS AND ANSWERS.

BY B. M. P.

The March issue of Cotton contained a number of questions of importance relative to the card room, and I will endeavor to answer them as follows:

We will consider, as stated in the questions, that middling cotton is used for making 20s warp.

1. If the settings on a card are correct, and the card is ground perfectly, what will cause it to make bad work?

Answer: Though the card be set correctly and the clothing ground with the greatest care possible, it may be doing work where in one or two respects, cleanliness or evenness is entirely unsatisfactory. In the first place the card sliver will vary in weight if the picker laps are uneven in weight. A lap may weigh correctly on the scales and at the same time have thick and thin places in it which would cause uneven sliver to be delivered from the card. It is a very good plan to test the evenness of the picker laps occasionally by weighing a yard or two on small scales. Laps improperly made, and splitting at the back of the cards will give uneven slivers.

A dirty lap from the pickers will put more work on the card than it can do, and a dirty sliver will result. A great deal of the work in a number of mills could be improved if the time and trouble were taken to keep the pickers cleaned out, and doing good work. Just throwing the cotton into the hopper, and taking off the finished lap is, by no means, all that is required in getting a lap in proper condition for the card.

Too much green or unripe fiber in the cotton will make a bad sliver. If the cotton is gin-cut and full of neps it will be very hard to get a good clean sliver. If too much waste is mixed with the cotton, the sliver will be bad. If the doffer speed is too high, the card will not have time to clean the cotton, and this will produce a bad sliver. In any of these cases the card itself may be doing its best and still produce a sliver either uneven in weight or dirty or both due to no fault of the machine.

2. How do you set your mote knives and licker-in?

Answer: Set the front mote knife to the licker-in with a No. 12 gauge; set the back mote knife to licker-in with a No. 10 gauge; set the licker-in to the cylinder with a No. 10 gauge; set the feed plate to the licker-in with a No. 12 gauge.

3. What is the best weight to run the card sliver?

Answer: The answer to this question depends upon the program of the mill, as sometimes 20s warp is spun from single roving, using only two fly frames in making the roving, while other arrangements call for double roving at the spinning frame, and three fly frames. I much prefer this latter arrangement, as it gives easy drafts and a stronger, smoother and more even yarn, on account of the extra doubling obtained.

When using single roving, a 40-grain sliver will be heavy enough, while for double roving, a 65-grain sliver can be used to good advantage.

4. How many pounds should a card produce in 10 hours?

Answer: A card, to do the best work, should not produce much over 150 pounds per day. With extra good, clean picker laps a card can do more than this and still

give a good sliver. But often the picker laps are not what they should be, and hence it throws too much work on the card. The tendency to crowd the cotton through the card with the idea of getting it to produce as much as possible in a given time, even though the picker laps are exceptionally good and clean, is not the best plan to follow, and is not always crowned with good results.

5. What number of wire should be used on card cylinders, doffers and flats?

ANSWER: Would recommend the use of No. 110's clothing on cylinders, and No. 120's on doffers and flats. In making No. 110's clothing No. 32 gauge wire is used. In making No. 120's clothing, No. 33 gauge wire is used.

6. How often should a card be ground?

ANSWER: Grind the cylinder and doffer once every four weeks or twenty working days, not counting Saturdays, as the mills usually shut down either at one o'clock or a little later, and no grinding is done on that day. The flats should be ground about half as often or once every eight weeks.

7 and 8. What advantage is gained by using coarse emery, and what by using fine or medium emery?

ANSWER: The best results will usually be obtained by using coarse emery for soft steel wire, and fine emery for hard steel wire. I much prefer the hard tempered wire, and for this style the No. 7 emery fillet will give as good results as can be gotten. When using the soft wire, I would use No. 6 emery. Would not recommend the use of finer or coarser emery on either style of wire.

9. How should the settings on the card be made, and why?

ANSWER: Set the flats to the cylinder with a No. 10 gauge at the back, and with a No. 9 at the front. Set the doffer to the cylinder with a No. 7 gauge. Set the doffer comb and flat stripping comb to a No. 10 gauge. Set the cylinder screen ¼ inch at front and 1/32 inch at the middle and back. Set the licker-in screen ⅛ inch at the end nearest the feed roll and to a No. 12 gauge at the end nearest the cylinder. Set the back plate with a No. 12 gauge at the bottom and 5/16 inch at the top. Set the front plate with a No. 12 gauge at the bottom, and regulate the top setting according to the amount of strippings desired to be taken out. The nearer it is set to the cylinder, the less the amount of strippings.

10. Should the wire be burnished after grinding; if so, why?

ANSWER: Unless a wire edge is formed while grinding the card, the use of a burnishing brush is not necessary, and under ordinary conditions would never be used. I prefer a hard tempered steel wire, as it retains its point longer, is not so easily "hooked," and the clothing will last longer.

In case the wire of a card becomes "hooked," there are two methods available to overcome the difficulty: Put the grinder back on the card and grind very light until you get a smooth point, or put on a burnishing brush, set it light and run for a few minutes. This gets the edges off of the wire. Put on the grinder, light, and grind for a short while. This is the best method and doesn't take so much time.

11. How often should a card be stripped?

ANSWER: Strip the card three times a day. This is preferable to twice a day.

## WEIGHTING TOP SPINNING ROLLS.

EDITOR COTTON: The weighting of the rolls for a spinning frame has lately been receiving considerable attention from the textile papers, and it is a subject that is very interesting to me. There has been no change in the method of applying the weights to the top rolls, since the first ring spinning frames were built. The general practice in this country is to apply the weight by a weighted lever, a stirrup and a saddle, while the English method has been to apply the weight direct to the rolls. Both of these methods are faulty, as there is no provision made to increase the weight when the rolls become worn. I am told that this subject of weighting top rolls has received the careful attention of the builder of frames, and that the modern frames are now weighted as they should be, due to this thorough investigation by the builders.

Now, I want to ask a few questions: Are top rolls now weighted as they should be? Has there been any change made in the method of weighting top rolls for spinning, and if so, what is the change? Is not the weight applied in the same old way?

The only change possible is in the amount of weight on the lever, which varies from 2 to 6 pounds. But the weight is applied in the same old six to one way. Accurate tests show that all modern frames have from four to six times as much weight on the front roll as on the middle or back roll, just the same as old frames. I have found in tests for weight on rolls that, through faulty construction of the lever screw and the lever, there are many instances where there is little or no weight on the back or middle roll. This condition is found on new frames; (possibly on old frames too) and should receive the attention of the spinner. The lever should be so fitted to the lever screw eye, that it will be impossible for it to bind, as it frequently does now. With top rolls so unevenly and badly weighted, one need not hunt very far to find the cause for much uneven yarn.

How many spinners know the actual difference in the weights on the top rolls of his spinning frames? How many spinners can be found who would put from four to five times as much weight on the front roll as on the middle or back rolls? Yet this is the actual condition found to-day on the most up-to-date American spinning frames. Right here I wish to state that unimpeachable evidence is found in the English method of weighting that the up-to-date American frames are carrying much useless weight on their front rolls. The English spinner never places such excessive weights on his front rolls, and the English spinner makes pretty good yarn, or at least, he has the credit of making it.

Assuming that the American method of weighting top rolls places useless weight on the front roll and insufficient weight on the middle and back rolls, the question arises as to why this is done. Is it for the reason that the American method makes less weight on the mill floor, or is it to save a few cents in cast iron? Or is it because they have always done so? It can not be that the American method makes better yarn, as many of the mill men in this country are purchasing frames weighted by the English method, that of direct weight on the rolls.

There seems to be a weight for drawing frame rolls that is conceded to be the best for the work it is to do. Can any one say the same for a spinning frame? If it is

claimed that there is such a weight, investigate the facts, and you will still find from four to five times as much weight on the front roll as on the others; and the means used to produce the weight prohibit any other result.

Another serious condition arising from this unequal weighting of top rolls is the useless and unnecessary wear of the front top roll covering. What to do with this roll when worn is a problem. Some transfer the front roll to the place of the back roll, so as to get more wear out of it before recovering. But, I believe the greater number of spinners prefer to put in a new roll and recover the worn one. This seems to be the better practice, because when the front roll is worn so that it won't do its work in front (with four times the weight on it that it will receive if used as a middle or back roll) how can it be expected to do the work of the back roll with only one-fourth of its usual weight. Every spinner knows that the top rolls of all spinning frames are not weighted as he would like to have them.

And he further knows that when his rolls are new, that less weight is required to hold and draw the roving than when the rolls have become worn. (Rolls do wear out gradually )and as they become worn, the roving will slip more or less. Here is another problem for the spinner, as he throws out the rolls only when they are worn out and will not hold the roving. How much uneven yarn, should be charged to the rolls when they are say, one-quarter worn? How much slipping is there of the roving? How much when half worn? And how much when three-fourths worn? Wouldn't it be a boon if you could increase the weight, as the rolls become worn and hold the roving, as well as when the rolls were new? Wouldn't it be advantageous if you could so weight your rolls that they would wear out evenly together and not have some good rolls and some bad? How can one expect to get even yarn from the best of roving with part of the rolls worn and part new? It is impossible, and yet many are trying to do it. The spinner has had to stand for lots of trouble that he couldn't prevent, but the time is coming when the spinner can do something to prevent much of the uneven yarn that is now being made.

# WOOL MANUFACTURING.

## FAULTS IN THE WOOL.

It is quite as necessary when handling wool for manufacturing purposes to know what features should not be present in a lot as it is to be aware of those characteristics that should be well in evidence. And if it be necessary that one should judge a sample for the qualities that are considered essential to the best results, it is equally desirable that what is not required should be methodically guarded against in exactly the same way. It should not be forgotten that the conditions affecting growth and preparation of wool are by no means stable. Breed and climate, which affect the producing animal—the sheep—can bring about changes in the material concerned which are not readily noticed, but which can make or mar the resultant top, yarn, or fabric. And, similarly, the treatment now given to wool, as dealt with on such a gigantic scale in the preparatory processes, such as shearing, skirting, classing, rolling, baling, and so forth, may easily be responsible for the development of defects unexpected by the user and of a very serious nature. It is well known that woll is sometimes one of the things that is not what it seems, and as very often when irregularities are found to exist it is too late to remedy these, a brief and concise statement of what constitute the defects found, and what effect these have on the manufacturing and wearing capacity of the material, as well as on its price, may prove of some service.

Mushy and Wasty Wool. This is evidenced by the openness of the staple, and also by stringiness among certain fibers. In such wools there seems to be too great a tendency to curl. There are also occasional irregularities in length. The cause of this is extreme dryness and warmth of climate, and the sheep having been unable to develop sufficient grease to preserve the form of the staple, sand and dirt have entered, creating the disorganization referred to. The harmful results of using this material will be shown by considerable noil in combing, caused by the breakage of the weak fiber, etc., and the severance of others in the effort made to separate those which are entangled. It will also be seen in the comparative roughness of the yarn that is now being made.—*Spinner.*

Irregular Wool. There are many forms of this defect, a very common one being due to unequal growth, the result of sickness in the sheep, or want of food. If this wool be held to the light the thin places are readily noticed, and, should strain be applied, breakage usually takes place at these points. Another form is that in which one end of the staple is thinner than the other, a result brought about by a diminution in the food available. Irregularities of length are also noticed in the longer-woolled types, due to breed impurity or want of attention. In all these wools the objection to their use is that of waste, due to breakage of fibers or a lack of uniformity in length, which means deliberate breakage to bring the material down to a controllable standard. In all cases this material, if employed, should be blended with better, and put to purposes in which the spinning of the maximum quality count limit is never approached.

Noily Wool. Noily wool is the result of want of shelter of the sheep from excessive heat, and the consequence of insufficient nourishment, whereby yolk, which preserves the wool, is produced. Wool of an oily type appears most open in fiber and entangled in staple. Like mushy wool, it proves very wasty.

Stringy Wool. Exposure to storms will often cause the wool to be considerably disorganized in staple, this usually appearing more marked after having been taken through the processes subsequent to shearing. As the proportion of top from wool depends very largely upon the condition (as regards straightness) in which the wool is taken into the machines, a good staple arrangement is absolutely essential for an economical result. Stringy wool should on that account be avoided. To straighten the fiber means breakage also, and as broken fibers never lie straight nor smoothly with others, it can readily be seen that a first-class result in top or yarn is not possible from material of this type.

JEAN WOOL. This is a term applied to wool that seems over-fine and weak in character owing to being badly fed or unduly exposed to climatic influences. The staples are indistinct, break readily, and in the various preparatory processes they increase considerably the noil section of the combing.

KEMPS. Of all enemies to the wool man these are perhaps the greatest, for there is no process through which the material goes in which this injurious influence is not either seen in the production of an actual defect unquestionably detrimental to the use of the material, or noticed as a quality feature, thus reducing considerably its value. Bad breeding and exposure are responsible for these. The fiber shows itself as a glassy structureless material of abnormal thickness and remarkable weakness. In the combing processes it means waste and faulty noil; in spinning, irregularities of thickness; and in the dyeing the production of specks in the fabric through the inability of the material to absorb the dye as does the true wool. Wool in which these defects are present is reduced many quality points, for the simple reason that the purpose to which it is put must of a necessity be second rate.

COTTY WOOL. This defect is generally the result of sickness on the part of the producing animal. In some cases often as much as half the fleece is found matted in almost an inseparable condition, and naturally when disentanglement by the only means available—the strong gill box—takes place, a breakage of a very considerable portion of the fiber must ensue. The defect is more common to the longer wool, and it may safely be said that none of these materials are suitable for first-class use, should they be characterized by cottiness, as the fibers when broken can not be expected to give either a cheap yarn or a yarn smooth in appearance or good in strength.

GREY WOOL. In some types in which the breed influences are low, the wool is in vari-colored fibers, which are found at the edges of the fleeces. The presence of these distinctly lessens the value of the material, for the reason that weakness is usually present also, and that owing to the absence of whiteness, uniformity in color after dyeing is impossible.

BURRY WOOL. Perhaps there is no defect more common or more costly than this, for the reason that there is no defect so prevalent, and none so difficult to overcome. The burr is part of the plant or shrub on which the sheep in Australasia, South Africa and South America abundantly thrive. In the shrub it appears like the small ball, but owing to its being of a prickly nature it catches the wool of the sheep during grazing, and is thus taken away. It holds to the fiber most tenaciously, and is found to encircle a number of these. If the burr should be allowed to go through the processes it will be opened up by the various pins employed, and once in this condition separation is impossible until the fabric is made, and then it is most cosfly.

It is not unlike some fibers in length, and it possesses innumerable points, standing from the main shaft like a centipede whereby it can cling to anything with which it comes in contact. Being of vegetable constitution all dyes act very differently from what they do on wool, and thus a fabric in which they are present must either be subjected to the slow and costly burling process, or be branded defective on account of "thickness." It creates considerable trouble in the drawing and spinning processes, for it clings to parts of the machinery in a way that creates serious irregularities.

HARSHNESS IN HANDLE. This is found in wool in which yolk is not so much present, and which consequently has a hard feel, not being anything near so well preserved as that in which there is a plentiful supply of this agent. The action of external influences, climatical for example, has been such as to raise the fiber scales and destroy the staple formation, and cause entanglement of the material. The same defects are met with in dealing with this material as are referred to in connection with wasty and irregular wools. In most breeds this weakness is found more or less in types not situated in suitable localities, or in those receiving unsatisfactory attention.

WIRINESS. This is an indication of poorly bred material. It is also grown on sheep subjected to shortage of food or to climatic exposure. The fibers are straight, coarse and badly stapled. Kemps are generally present. If the material be spun there will be considerable trouble, and when the yarn is finished the handle will be distinctly unsatisfactory.

TIPPINESS. The wool generally concerned with this defect lacks robustness. A superabundance of short growth is present, and the top of the staple is coarse in fiber and somewhat irregular. Bad breeding is the cause of this, as well as exposure, and in the manufacturing processes leanness of yarn and cloth, and roughness of handle are the characteristics.

STAINED WOOL. In some of the more yolky merino types the coarse fibers, particularly on the edges of the fleece, seem to have undergone some yolk-hardening process, which has the effect of permanently staining the fibers. To the untrained eye it would appear as if this discoloration could be readily removed, but in the scouring process nothing short of disintegration of the fiber could accomplish this. As a consequence the material must needs be left in this stained condition, and used in dyeing for those materials of the darker shades. When bought for this purpose and the price paid accordingly there is no serious disadvantage to this, but should this material be present in a lot required for light colors, considerable disappointment will be met with in either the dyeing of the top or the piece.

FAULTS OCCURRING DURING PREPARATION.

CLEANY WOOL. This is due to bad organization and to want of cleanliness at the time of shearing, with the consequence that when the handling of the fleece takes place, short, small locks, the result of second clippings or dirty bits are allowed to go forward with the better material. The first drawback to this is the waste, but as the low locks are often in a very bad or greasy condition they cause discoloration of the other material in a very objectionable way.

CRUTCHINGS IN WOOL. Though this is not common, it is sometimes found that crutchings—that is, short fiber cut from the hind-quarters of sheep—are thrown into the material for the purpose of increasing the weight. Were this the only drawback, pernicious as it is, it would not be so serious as are the dirt and grease which spoil the fiber with which these are mixed. Moreover, these are so greasy and discolored that they considerably injure the quality of the noil.

FRIBBY WOOL. Fribs are short staples, the result of second cutting during shearing by an inefficient hand. When present with the longer material they have to be removed in the combing process, with a disadvantageous influence on the price of the resultant top.

Tar Brands. Of tar in wool due to brands being unremoved it is hardly necessary to speak. The strong influence of this agent is never overcome, and the action it has on other fibers with which tarred staples come in contact is such as to cause the most serious trouble in all subsequent processes.

Twine as left on wool might also be disposed of with a word, as its injurious influence is now so well known. Its presence is due in the first place to carelessness; in the second, to too great a desire for economy. Its effect, however, is most far-reaching; separation, when once the material has entered the machines, is impossible until the last process is reached, and then the cost of separation is almost prohibitive. Should it not be removed, owing to its different dye-taking capacity, the fabric is in almost every case absolutely spoiled.

The foregoing, numerous as they may appear, by no means exhaust the list of those that may be mentioned. They are, however, the most important; but it may be of interest to wool-growers to obtain some information regarding those which have been mentioned, for although not the most agreeable subject, it is as well for all interested in wool-growing to face the possible faults which may depreciate the value of their clips.—Dalgety's Review.

# KNITTING

## THE UNDERWEAR KNITTING MILL.

Knitting Mill Accounting—Depreciation Cost—Cost Systems—A Daily Cost System.

(*Contributed exclusively to* Cotton.)

BY C. O. TERWILLIGER.

PART IV.

A general sketch of the working conditions of the average "cop yarn" knitting mill was given in the preceding articles in this series. By "cop yarn" is meant yarns spun on the cotton and worsted systems, and which are usually sold on cops or cones. The term is used to distinguish such yarn from yarns spun on the woolen system by the knitting mills themselves. This latter class of mills confines its operations almost exclusively to wool underwear, and the yarn making machinery is the same as used in the woolen mills. Thirty years ago nearly all underwear was made of wool spun yarn, but the past twenty years has witnessed the steady decline of this class of goods, until at the present time, there are comparatively few mills making it.

Wool yarn has been succeeded largely by worsted, yet the most decided inroads into that business were caused by the introduction of fleeced-lined and ribbed cotton goods. Then, too, the finer qualities of wool have advanced in cost without a corresponding advance in the price of the manufactured product; hence, the wool lines were either cheapened to meet the fixed selling price, or the business discontinued. The wool effect is perfectly produced with a small percentage of worsted in conjunction with cotton by so-called "plating." A fine worsted yarn is used with a coarse cotton yarn in such a manner that the former is brought to the face of the fabric, giving it the appearance of having a large percentage of worsted, when as a matter of fact with the use of modern machinery, it contains only 25 per cent. and still passes muster, producing a far superior wearing and "feeling" garment than with a wool spun yarn containing 25 per cent. wool. Furthermore, with the use of French spun worsted and cop yarn, it is unnecessary to wash the cloth, since both are free from oil and dust.

### DEPRECIATION COST.

In going into detail with each one of the various subjects in the previous articles we will first consider the item of organization. Synonymous with organization is cost of production. Without an approximately correct estimate of the cost of a garment, it is impossible to properly organize. To form a company, erect a building, purchase some machinery and estimate the working capital on the basis of an inaccurate production cost, will surely develop a mass of trouble later.

Cost is the important item of the knitting mill and is closely followed by selling prices and amount of sales. By cost we mean every item which has to be paid for and which forms a part of the product, directly or indirectly, visible or invisible, present or in the future. In making a cost, it is easy to mortgage the near future to meet seeming competition, and is often done at the expense of a demoralization of the sale of a certain line of goods. Any one can sell goods at a price which will command the major portion of the business of that particular line, providing he does not get a price to cover the full cost. This is not good business policy, and the end in such a case will not be far distant.

In determining cost, the first item to be discussed is depreciation. The mill may be located in a section where the real estate may increase in value, but the mill building as an inclosure for machinery is constantly depreciating in spite of frequent repairs. If this be true, a certain charge must be added to the cost of the underwear to offset this depreciation of building and machinery. The exact amount of annual depreciation varies with the type of mill and class of goods manufactured. Some machines deteriorate faster than others. Then, there are some classes of machines which are being frequently improved; this year you may have the latest and best, and in a short time these same machines ought to be relegated to the junk shop or sold to second-hand dealers, to be superseded by a new machine on the market, which in its economy of operation and production has depreciated your machine to the extent that you can no longer afford to run it in competition with mills having the others. This condition often occurs with sewing machines.

The point to be impressed upon the minds of our readers is to add enough cost for depreciation so as to be able to take advantage of purchasing new machinery without impairing the working capital. The question now arises as to what this percentage of depreciation ought to be with the average new mill. The best practice is to keep the building and machinery separate, writing off 1/20 of the cost of building, and 1/10 of the cost of the machinery each year, making this sum a fixed charge against the esti-

mated yearly production. This plan puts the business in a position to erect a new building at the end of twenty years and have an entire new equipment of machinery in ten years without calling on the stockholders for more money. Even with this plan in force, the repairs should be well kept up and charged to the repairs account as part of the cost of the product. To some, this suggestion may seem an exorbitant amount, but it is the practice of the best mills.

### COST SYSTEMS.

A good cost system is most essential for the knitting mill. In the old days, an inventory was taken once a year, and the results of the year's business were not known —only estimated—until then. Many mills close their books quarterly, and a few have a daily cost system in use. The daily cost report must actually show the full cost of the daily product. Such a system requires some expense to start and keep in operation, yet is well worth it, since one can tell each day whether or not the mill is working at a profit. The reason why many mills have not installed this system is because they expected to get the information with the same clerical force as with the old regime; in other words, expect something for nothing.

A daily cost report may be more or less complicated, depending upon how much accurate information is wanted. We have in mind an efficient system which has been in use for many years, and one which will answer the requirements of the average sized mill. For the benefit of our readers we will give a few examples of the different forms used in the operation of the system. Form No. 1 shows the complete daily report as prepared out in the office from separate

**Daily Report of Operating Cost.**

| DEPARTMENT | LABOR | SUPPLIES | REPAIRS | WASTE | TOTAL | |
|---|---|---|---|---|---|---|
| Picking | 6 00 | 2,440 00 | 1 25 | 11 26 | 2,458 51 | |
| Carding | 14 00 | | | 2 20 | 16 20 | |
| Spinning | 21 00 | | | 4 00 | 25 00 | |
| Winding | 7 50 | 1,220 00 | | 1 30 | 1,228 80 | |
| Knitting (Flat) | 8 00 | 12 00 | | 1 10 | 21 10 | |
| Knitting (Ribb) | 4 00 | | | 86 | 4 86 | |
| Knitting (Ribbers) | 3 50 | | | 95 | 4 45 | |
| Cutting | 4 00 | | 2 50 | 130 08 | 136 58 | |
| Finishing | 38 00 | 86 00 | | 21 17 | 145 17 | |
| Washing | 2 00 | 3 40 | | | 5 40 | |
| Fulling | 1 50 | | | | 1 50 | |
| Drying | 2 00 | | | | 2 00 | |
| Dyeing | 3 00 | | | | 3 00 | |
| Brushing | 2 50 | | | | 2 50 | |
| Misc. Expense | 90 | | | | 90 | |
| Depreciation | 12 00 | | | | 12 00 | |
| Ins. and Taxes | 7 00 | | | | 7 00 | |
| Heat and Power | 12 00 | 8 30 | 2 50 | | 22 80 | |
| Interest | 6 50 | | | | 6 50 | |
| Fgt. and Ctg. | 3 20 | | | | 3 20 | |
| Executive | 17 46 | | | | 17 46 | |
| | $176 06 | $3,769 70 | $6 25 | $172 92 | $4,124 93 | |
| | | | Waste | | 172 92 | |
| | | | | | 3,952 01 | |
| Selling price as per boxing report attached. | | | | | | 4,212 81 |
| | | | Balance. | | 260 80 | |
| | | | | | 4,212 81 | 4,212 81 |

Waste per doz. Flat .42 Ribbed .38
Labor " " .76 .63

FIG. 1. DAILY COST SHEET.

reports from each department. The form is applicable for a mill spinning yarn on the woolen system as well as for one purchasing cop yarns. The different departments are supplied with blanks calling for the information as required by report No. 1. Usually the foreman in each room fills in the data and sends in the report every morning. A clerk should be put in charge of these reports, making it his special work to see that the department reports are given in correctly and promptly. This clerk must have free access to the stock ledger to familiarize himself with the different materials and also to enter all supplies used for the day. He must know the prices paid for the several pieces, and operations.

To give the reader a comprehensive idea of this system in the office. Waste is made in this department and the amount of each kind should be stated on the report. The waste in each department is really a credit, no matter whether sold or used.

CARDING DEPARTMENT.—Labor, waste and repairs are given as in the Picking Department. Supplies include card clothing and oil, and are only stated when used.

SPINNING DEPARTMENT.—This report is the same as for carding, with new banding, bobbins and spools as supplies.

KNITTING—FLAT DEPARTMENT.—This report must show the same items as the other departments as well as the production of each knitter in pounds of cloth. Each cylinder must be given a number, and under this number the production will be written, also the size of the cylinder and the size of the cloth. The boy taking out the rolls of cloth will fill in this information and write the style, size, weight, and number of the machine on the roll, thus: B. S. 21-56-3. This information is for the use of the cutter so that he may select the proper rolls for his orders. The total number of needles used is stated, some mills keeping a separate account of the breakage from each machine.

KNITTING—RIB AND RIBBERS.—This report is the same as for flat knitting.

CUTTING DEPARTMENT.—The supplies and repairs to this department are few, new shears or knives and repairs to same constituting the sum total. The waste from each style of goods must be shown, and the number of dozens cut from every roll of cloth. This is a very important department and while one does not wish to impose too much "bookkeeping" upon the foreman, it is well to get the waste from every roll. In a previous article we pointed out the possibilities of waste and economy at this stage of the process.

FINISHING DEPARTMENT.—This report must include the number of dozens looped, seamed, covered, finished, pressed and folded; also a boxing report showing the number of dozens of each style and size boxed ready for packing. The repairs to the sewing machines are of some account, and it is advisable to state the class of machines requiring the repairs or new parts. The supplies are also a large item, and the quantities used must be accurately given. Buttons are kept in units of 10 gross; woven cloth by the number of pieces; tape and braid by 5 gross packages; thread and silk by cones; and boxes by the actual number.

WASHING AND FULLING.—This report is the same as the others, except the supplies which usually consist of soap and alkali, these items being recorded in original packages.

DRYING.—The same report as for washing and fulling.

DYEING.—Same report as for drying, the supplies being in the nature of dye stuffs and chemicals which are indicated in pounds.

BRUSHING.—The report is similar to the one for dyeing.

HEAT AND POWER.—A record must be kept of the number of pounds of coal used, also oil, etc.

All information relative to miscellaneous expense, depreciation, insurance and taxes, interest, freight and cartage and executive are furnished by the office.

MISCELLANEOUS EXPENSE, includes any expense not otherwise provided for.

DEPRECIATION.—A fixed daily charge computed on the valuation of building and machinery.

INSURANCE AND TAXES.—A fixed or variable daily charge.

INTEREST.—A variable daily charge.

we will take up each department separately, as follows:

Picking Department.—The report must show the number of hours worked by each person. The supplies include raw material, such as cotton, waste, wool, noils, etc. The lot number of each package used must be stated and also the gross, tare and net weights. If oil is used to make an emulsion for the stock, the quantity must appear. Repairs, if any, must be given, the cost of which is usually computed

Freight and Cartage.—A variable daily charge.

Executive.—A fixed daily charge.

The different forms used in the various departments may be changed to suit the conditions of any knitting mill. Referring to form No. 1, the waste column is taken as a credit against the total cost. If any of this waste is used by the picking department it must be entered as a supply, the value of which is to be determined by the market price when used. In order to make this operating report a working statement of profit and loss, the report of boxed goods is carried as a credit, and the value of the same stated at the net selling price per dozen for each style. In this manner a debit balance will show a profit, and credit balance a loss. The only feature of this system having a disadvantage is when the mill is first started, since it will be some little time before goods will be boxed, and the credit balance will appear as a loss, when really it may not be. Still, if the mill were stopped and the stock run out of the different departments, the debit balance or profit would be large. However, in either case, the actual cost is shown.

# DYEING, BLEACHING AND FINISHING

## THE CRESCENT AND THE ADELPHI WORKS, SALFORD.

The following article with the above caption was printed in "Bradshaw's Manchester Journal" on Saturday, August 14, 1841. A copy of this journal is in the possession of Stewart F. Carter to whom we are indebted for the article. In describing the new bleach works, it says:

"Instead of the extensive fields, and numberless low buildings occupying acres of land, which characterized similar establishments in the olden time, the whole process of bleaching, starching and finishing is conducted almost entirely within the premises.

In a low adjacent building, the goods to be bleached are subjected to the first process, that of boiling or steaming in an alkaline ley, by which the dirt or coloring matter is loosened and partially separated from them. A number of immense caldrons are ranged round the place, each of which is furnished with an iron grating fixed a few inches above the bottom of the boiler: to this an iron pipe is attached, with a raised concave top. The pieces of cloth, first tied up in bundles of a dozen each, are placed upon the grating, in regular layers to the top of the vessel, a quantity of ley is then poured upon the whole, and this, by means of steam introduced below, is soon heated to the boiling point, and rising through the center pipe is again distributed over the surface by means of the concave top, until by continued circulation the whole mass is thoroughly penetrated.

The cloth, or yarn, is then conveyed to large cylindrical barrels, technically styled dash wheels, hung upon their axes, and turned round by steam power. The interior of these machines is divided into four compartments by rails, into which the goods are introduced through circular apertures in front, whilst behind, a pipe is inserted, by which a constant stream of water is thrown in, and the machine being set in motion, the goods are dashed from side to side until by that means they are thoroughly cleansed from any remaining extraneous matter.

From the dash wheel the goods are removed to cisterns, fitted up so as to admit of diluted chloride of lime being circulated through every part of the vessel, by means of pumps worked also by steam power: From whence they are removed to other cisterns, where highly diluted sulphuric acid is applied to them, the dash wheel being used between each process, and the goods freed from the water by passing through rollers constructed for that purpose. When by this means, the requisite degree of whiteness has been attained, the cloth is removed to the starching room, where, after each piece has been temporarily sewed together, the whole is, by means of a very ingenious machine, at once starched, rolled perfectly smooth, and thoroughly dried, ready for making up in separate pieces for the warehouse.

For cloths of a coarser or stronger texture, which are sold or used in the grey state, two rooms are fitted up with machinery for dressing and finishing them; the three uppermost ranges of windows admit light to the stove, which is equal in height to three stories, and extends over the entire building, this spacious room being heated by large steam pipes, intersecting every part of the floor. Currents of air can also be admitted by an excellent arrangement of the window shutters, the whole of which can be opened or shut, either partially or entirely, by a single lever and the ordinary power of one arm.

The stove is divided into three compartments; across the top are placed a number of horizontal rails, about one foot apart from each other, from which the cloth to be dried is suspended in long folds by means of a patent machine, worked by two boys, who can fill the stove in an incredibly short time. The same method and dispatch are displayed in removing the cloth, which is so hung as to allow of all the pieces in the stove being drawn into a separate room by one man, who can also at the same moment, fold it in equal portions, ready for packing, whilst, by a machine now common in large manufacturing establishments, the goods can in a few seconds, be raised from the cellar to the top of the building, or lowered with equal celerity.

The admirable economy of space, material and labor which distinguishes the management of the Adelphi bleach works, strikingly illustrates the rapid advances of our manufacturing skill. In the preamble of an act passed passed in 1542, for abolishing the privilege of sanctuary in Manchester, it is declared, amongst other reasons for the statute, that "the linen yarn must lie without, as well in the night as in the day, continually for the space of half a year, to whiten before it can be made into cloth, and the woolen cloths must hang upon the tenters to be dried before it can be dressed," by which great facilities were

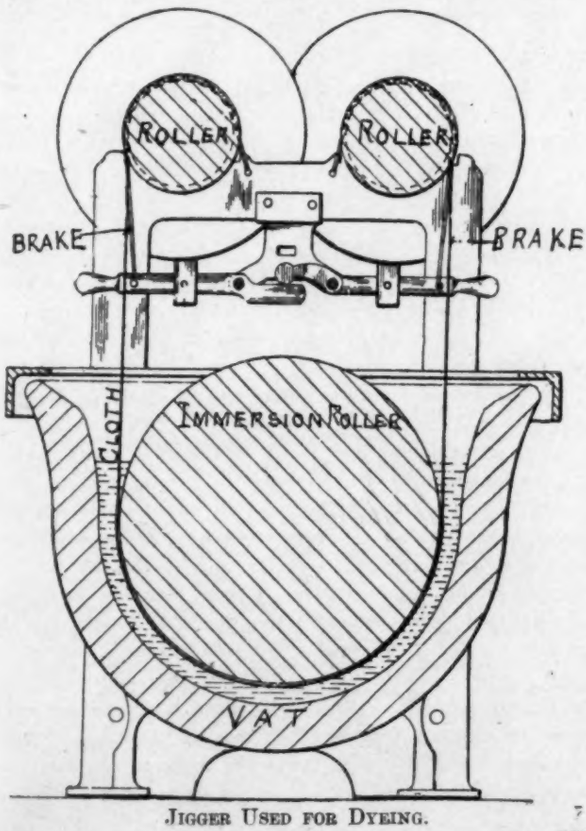
afforded to "divers light and evil-disposed persons to steal yarn from the crofts, and cloth from the tenters, to the great impoverishment of the owners, and to the destruction of the confidence formerly reposed in them by their creditors, which, if not prevented, will lead to the decay and desolation of the town."

It is no uncommon occurrence now for goods to be sent down from the manufactory in their grey state in the afternoon of one day, and to be offered in the market on the following morning, bleached, dressed, starched, and finished; and thus the bleacher fully sustains the general railway expedition that begins to characterize every department of our national industry. When results like these are contemplated as a portion of the triumphs of human intelligence over mere inert matter, it is surely not too sanguine to anticipate the period when, instead of glutted markets, depreciated stocks and unemployed artizans, consequent on the abridgement of physical labor, by the application of machinery, the humblest classes of society will be so far relieved from the necessity of ceaseless toil, as to possess at least a few hours of each day for domestic and social enjoyment, and the cultivation of their immortal minds for the loftier joys and purer pleasures of that more glorious state of being, held out by the relevations of truth as the object of our common faith and hope, and where "boundless charity divine" shall never die."

## JIGGERS.

We illustrate herewith an English invention of a jigger the object of which is to economize the dye liquor and, at the same time, to dye the piece thoroughly.

The dyebath is provided with an immersion roller, which displaces the liquor over a greater area, and consequently subjects the piece to a longer immersion. If the vat is circular the immersion roller is also circular, and only slightly less in diameter than the interior of the vat. If the vat is angular, then the immerser is of corresponding contour, and rollers are arranged to facilitate passage of the cloth. The cloth passes from one jig roller under or around the immerser to the other jig roller in the usual manner, and the immerser almost filling the vat a comparatively small quantity of dye liquor is required, the small quantity being spread over a much larger comparative area, and the cloth is thus subjected to a longer immersion, though less liquor is used.




JIGGER USED FOR DYEING.

The immerser may be corrugated or fluted to allow the liquor more readily to saturate the piece, and it may be provided with apparatus for raising and lowering it out of the vat when necessary.

A convenient method of applying or removing friction to or from the jig rollers comprises the brake bands passing over brake wheels on the shafts or axes of the jig rollers, and the frictional contact on the rollers is applied and regulated by means of the hand levers and with their inner ends in contact, and the friction can be removed from both rollers simultaneously from the handle on the right hand side of the machine. When adjusted the levers can be fixed by pins passing through same and through brackets.

## MERCERIZED WHITE BROCADES.

In the finishing of mercerized white brocades with a cambric ground on which is woven a spot, stripe or floral design, great care is required to give the correct finish and appearance to the cloth. These goods are generally in three widths, viz., split cloths, 56 in. wide, 34 in. full width and 30 in. full width. A dull ground with a well raised and bright object is the general requirement.

The better qualities if well mercerized, and this is an important point for managers of works to pay attention to, need little finishing; stretching to width and a light run through a cotton nip will give the finish required. If the cloth is not closed up, a run through a calender with three wood and two brass bowls, two wood bowls at the bottom, then one brass, then one wood, and one brass at the top, will give the required closing or milling up of the goods without getting the ground bright or the object too flat. If two runs on this calender are required then the goods should be run with the face to the wooden bowls in the last run as this gives a decided improvement to the finish. The lower qualities require far more work and care.

It has been found best to calender these with a good weight before filling, using plenty of water before calendering to help to mill up the goods. During the filling process the goods should be run with the face to the filling so that the objectionable ground brightness may be taken off. The goods are then damped, allowed to stand for two or three hours, and then given three nips on a cotton and steel bowled calender, keeping the goods with the face to the cotton as if the face of the cloth is allowed to come into contact with the hot steel bowl the goods will be altogether wrong in finish. Plenty of weight is required to close up the goods. If the design is at all flat a run on the belt stretcher will generally give the desired appearance. —*The Dyer and Calico Printer.*

The South Carolina Cotton Manufacturers' Association has selected Hendersonville, N. C., for its annual convention, to be held June 10.

# Practical Problems Discussed by Cotton's Readers.

Discussions of Mill Problems are Solicited for this Department.

## HINTS FROM A CARDER.

BY J. H. Y.

There has been a great deal written of lappers, cards and other card room machinery, but it seems that every man has more or less peculiar experiences that are instructive. I have had a great deal of experience with these machines for the past thirty years, and have had many problems to solve in that time.

The picker and opener room is a very important place in a cotton mill, and if the stock gets wrong here, it is out of the question to ever properly straighten it again. On all classes of cotton, the more bales you mix together, the better results you will get; all carders should know this. Be very careful also to mix your waste as evenly as possible and at the same time in sufficient quantity to give you a whole day's run on waste. A great many carders leave this point to the opener tender or the mixing gang, and they never know just how it is done as other matters generally claim their attention. All carders should be very careful to see that their mixing is performed properly and then a great care will be lifted from their shoulders.

It is well to examine the automatic feeders every little while and see that the spike apron and bottom apron are not slipping, as these two aprons will give a lot of trouble if they are allowed to slip, for it will make thin places in the breaker laps and cause the intermediate to fail to do its work effectively.

The laps on the intermediate pickers should be placed on the aprons so that there shall be two half full and two full laps, or at least a good deal of difference in the sizes of them, so as to prevent slipping of the apron. This is where nine-tenths of the carders make their greatest mistake; the little rollers or wheels that drive this apron are very small and have but little friction, and consequently four full laps will cause the apron to slip and make thin places in the lap, which will eventually give trouble all through the mill.

Be sure to see that the apron is kept perfectly tight and that all of the journals and rollers connected with the apron are running free, and that the evener belts are in good condition and kept tight. This applies to both the intermediate and finisher pickers. Many a carder will walk through his picker room and if the floor is clean and all hands seem to be at work, he will assume that everything is O. K., and pass on to some other part of his room, never thinking of inspecting his machines to see for himself that everything is in proper order. Sometimes he will ask the finisher man how the laps are running, not thinking that this man will lie at all, and will take his word as to the conditions on his machine.

Every overseer must bear in mind that he is between two fires and must be careful that his man under him does not fool him. It is well understood by all mill men that a majority of the operatives are simply looking for "pay day" and "stopping time," and have no interest in the work or the overseer's responsibility. So he must bear in mind that he is paid to watch these points. Visit your lapper room more than any other part of your department, as nearly all the irregular work starts from this place. Do not take any man's word, but see for yourself that your machines are kept in running order, and also that all parts which are liable to catch cotton, such as the beaters, screens, grid bars, draft parts, and evener drums, are kept clean. A little oil or grease on an evener cone or belt will give you no end of trouble. See that all these parts are kept in good condition. The intermediate laps should be weighed from four to six times a day. This will help the work of the finisher picker a good deal. When you find a few finished laps on the floor, weigh a few of them; it will let your finisher man know that you are looking after a few things yourself.

The writer does not believe in abusing his help at any time. If they do not understand what you want, take a few minutes' time to show them, then watch and see if they want to do what you told them. If they do not care to obey instructions just let them go and do not abuse them, for they have feelings the same as you. If they have a spark of fairness in them, they will consider this and come back to work, and in nearly all cases make good hands afterwards. It is advisable to avoid changing help as much as possible for this reason, as a hand that is used to a machine can get more and better work from it than a new one. It does not matter how much a new hand knows about a machine, he will lose production and probably make bad work for a few days, and the mill generally suffers for this.

It will benefit a carder to inspect his scales once or twice a day, as the jar in a good many picker rooms will have some effect on the regulation screw. Sometimes the scales will get out of order and the finisher tender will never notice it until a great many laps have passed as O. K., when as a matter of fact they would be from three quarters to one pound off; then irregular numbers are the result. If the carder does not keep all of these little things in practice daily, he does not know where he stands at any time, and it is likely that bad running work all through the mill is often caused by the neglect of the carder who depends too much on his second hand to run the room. A carder rarely ever gets the ultimate credit for letting someone else run his department, very often the second gets his place. I do not mean to say that an overseer must not let his second hand have any authority. Let him do his part and be sure you attend to yours, as there is plenty of work for both to do.

It does not matter how small the department is, remember that you are handling another man's money and that he is depending on you for the best results. Do not get out of heart because the work is running badly. Keep in mind the fact that you are at the root of the tree, and if you get wrong, no one else can straighten the work. It does not matter how efficient the spinner is, he can only do his best with what he receives from the carder.

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Editor Cotton: What will cause kinky filling on a plain two-harness Draper loom making sheetings? Also, can Saco & Pettee roving frames be made to run the same tension gears if they are all on the same hank roving?—R. B. H.

## MANAGING COTTON MILL HELP.

BY T. J. G.

Managing help in a cotton mill is a very important factor in the successful operation of a plant. First, you need good, moral people that will work and do all in their power for the good of themselves and the mill. Second, you should have people who will stay with you and not be always changing from one mill to another. Where you see a steady class of people in a mill, you see good production and good quality, and that is one of the points in the success of a mill. To get this kind of people is the duty of the superintendent.

The superintendent and overseers must be men who know right from wrong as far as the interest of the corporation and labor is concerned. A superintendent should treat everybody in his employ with courtesy and be kind and sympathetic, doing little deeds of kindness at times of a personal nature, and at the same time have his discipline carried out to the letter about the village and in the mill. The overseers should look after the good of the employees. For instance, if one of the operatives gets sick, the overseer should visit him or her on a Sunday or at night, and see if he can be of some help to them. This act of attention helps to create a devotion for the overseer, and when the hands feel the bond of friendship, they take your orders in the mill as just and right. You must prove this to be true by the strict and unwavering position you take in connection with their work. Be very careful not to give a wrong or unjust order. Do not get so strict that you will be unkind. Always be respectful to your help, and give a kind word when it is deserved. However, the minute you yield one point to a hand because he is connected with a large family of help or some other cause which is likely to spring up, you lose in influence over that hand, and you will be expected to conform some of your ideas at least with his and others in the future. And there is where you will be losing ground as a help manager.

In the case of piece work, it often happens that the work is not up to the requirements of the mill, and the person making that part is fined. In such cases you must use good judgment in passing on the trouble, for it often happens that the source of the trouble is a process previous to the one where it is found. The section hand should be looked after closely, as sometimes good hands have been forced to quit their jobs for no other reason than the section hand imposing on them and not keeping their machinery in good order. Sometimes there is too much confidence placed in section hands, causing them to get careless. In this way you sometimes lose good help. You should watch second hands and section hands and also regular hands with equal interest. If your second hand is the man he should be, his orders should be carried out as though they were your own. Always find his faults before the hands find them and come to you with them. Never talk to the help in work hours except on business. Should they approach you on any other subject, answer them kindly, but turn the subject as soon as possible and not show any unkindness.

You must have a good clean village. If you find one person or family in your mill or village who is a discredit to the place, promptly get rid of him, and his place will be filled with a better man. That will induce the best people to stay with you. Good people are easily managed at all times; in fact, they do not need any managing. Always try to induce the families to have a garden and have flowers in their yards. This makes any place look more like home, and as flowers are a special gift of God, the people will surely be better satisfied.

## COTTON MILL WASTE.

BY J. K.

While this subject if fully dealt with would reach beyond the limits set for this letter, a brief review of some of the causes of waste in the making of cotton yarn and cloth might not be out of place, considering the importance of the subject. Starting with the picker room, the most important thing to be noticed there is the setting of the grid bars. These settings are neglected to a great extent in some mills. Improper settings can produce a great waste of good fiber. The fan draft should also be watched; the belts driving the fans kept from slipping; the dust room cleaned at regular intervals; and the flues kept free from chokes, as any fault of the draft is liable to cause a split lap, besides other troubles, such as poor lap selvages, etc. The cone belts, especially on the finishers, should be kept in good order, so as not to slip and cause a break in the lap, which will, besides throwing it off weight, render it unfit for the card.

The proper settings of the mote knives, licker-in, cylinder screens and front plate on cards are also of great importance and should receive careful attention, in order not to waste good fiber. It is sometimes necessary to pull off a piece of lap, say a quarter or half of the full lap, from the back of a card. When this is done, it should not be carried back to the picker room, nor rolled off into a waste can, but should be run up at some other time. Care should be taken in piecing up a card sliver to make a good splice that will not pull out on the draw frame. Clean cotton should be kept off of the floor. It is a good idea to pick up white cotton from the dust pans or any other place before sweeping. Cans should not be run so full that they can not be kept from spilling over on the floor when doffed.

Stop motions on drawing frames should be kept in good order to prevent the running of singles, over-full cans, waste between the front rolls and calenders, etc. Full cans should not be handled so roughly as to damage the sliver, or spill it on the floor. Care should also be taken at the drawing frames and slubbers to make good splices when piecing the drawing, and several layers of good sliver should not be pulled out of the can in doing it. In creeling fly frames, if it is necessary to break back ends with several layers of roving left on the bobbins, they should be saved and run off later on one or two spindles on the machine, instead of being cut off of the bobbins. In creeling, the roving end on a full bobbin should not be twisted in several inches on the end of roving going in as is often done, because this makes three strands of roving fed at the same time where there should be only two.

These two points also hold good to a great extent in spinning. If the speed of the spinning frame is too high, it is liable to make bad yarn, thus causing waste at that process. The frames should be kept in good condition, so as to enable the spinners to keep their ends up, and section men should see they do not neglect their work or allow stick

waste or roving to fall on the floor. Doffers and spinners should not be allowed to lap on two or three pieces of yarn on a bobbin in the attempt to piece up an end after doffing, as this makes considerable waste in spooling and weaving. Lifting rods that stick can also cause a good deal of waste.

Spoolers should run all of the yarn off of the bobbins onto the spools in order to avoid the necessity of cutting the yarn off of the bobbin. The operative should not merely lap an end around a spool instead of knotting the two ends, as is sometimes done. The stop motion on the warper should be kept in working order so as to have a uniform number of yards on different beams. The friction on the section beams on the back of the slasher should be kept as nearly equal on all the beams as possible, so that they will all run out at the same time. If the warp is properly combed before it is taken off the slasher, a yard or two should suffice for straightening the ends before drawing in. Any more than this would be unnecessary waste. Weavers should be taught to be careful and avoid making seconds, and should not be allowed to knock filling off of the quill. Fixers should keep their eyes open for any fault due to the loom, such as reed marks, etc.

These are only some of the causes for waste, as every one knows, but they are perhaps the most frequent. While the waste made in the spinning and weaving rooms does not as a rule equal that made in the card room, yet, pound for pound, it is a great deal more valuable, and should be watched the more closely for that reason. Every mill has its own peculiar difficulties to contend with, which must be solved according to circumstances, and it is the duty of every overseer to keep his eyes open to detect these causes, as the making of waste is one of the most vital questions of manufacture.

## GOVERNING HELP IN A MILL.

BY L. M. B.

The foremost essential for governing the help of a mill is a competent manager. He should thoroughly understand the work of each employee under his management, so that they will not lose confidence and hesitate to come to him for assistance. He should be ready to render assistance whenever necessary and avoid any unpleasant remarks when help is requested. Operators' machines not in good running order should be adjusted as quickly as possible. The speed of the machines should be kept as nearly uniform as possible.

The management should be exact in keeping the operators' time, so that they will not become dissatisfied, but will feel that they are getting fair treatment. All complains should be given due consideration. Mistakes on the part of the management towards the employees, or misdemeanors on the part of one employee toward another should be corrected promptly. The management should be ready to settle disputes, adhering to the rules as set down by them, and avoiding any reference to the family or outside friends of the employees. The management should not hesitate to express their appreciation for good work. They should see that the surroundings of the employees are as pleasant as possible, and should extend favors when possible to show their interest in the employees.

## SHADY CLOTH.

BY G. T. J.

As a rule, all colored goods mills are bothered more or less with shady cloth. There are a great many causes of shady or evenly colored cloth, and most of them are simple and of daily occurrence. For instance, in the dye house, by not matching shades; or the mixing of the yarn in the card or spinning room; or the looms letting off unevenly and not taking up right. There are other causes of a deeper nature that are found where we least expect them to occur. If uneven yarn comes to the weave room, either light or heavy, it is sure to cause shades in the cloth, when using a plain one-shuttle loom. The fine yarn will naturally put in more picks per inch than the heavy yarn and cause dark places in the cloth. Should we be using fine yarn and get a bobbin of coarser count it will produce a light-colored place. As a rule it is generally the fine yarn getting in with the heavy that causes the worse appearance.

There are several places where this yarn can be made unnecessarily fine, the worse place and one that is generally overlooked being at the drawing frames. Should these frames get out of working order so that they do not stop when a sliver breaks, but are allowed to run until seen by the operative, uneven yarn in some bobbin will result which will cause shady cloth. Some may ridicule this idea, but let me say that I have seen more shades caused from this one thing than from any other cause. I have known of mills having to send 500 miles to get a competent man to stop shades and when the man came he found that three times out of five the shades were traced back to the drawing frames.

## THE IDEAL LOCATION FOR A WEAVING MILL.

BY A. A. D.

When a site for a new mill has to be considered, it is necessary to decide upon one that has the advantages of ready access to the markets for both the raw materials and the manufactured article; also where a good and constant supply of water and fuel is easily obtainable, and a locality where experienced help is obtainable to run each department of a mill successfully. Next comes the position of arrangement of the mill buildings. As cotton works much better where there is moisture, the mill should be built on a clay subsoil with a westernly position and sheltered from the north and east winds. If ground is cheap, all of the preparing and weaving should be done on the ground floor; or if not, then winding, warping, sizing and drawing-in may be done on the top story, with the weaving room and yarn stores on the ground floor. It will be found that leaving the weaving all on the ground floor is a great advantage, as this plan secures freedom from the vibration and more uniformity in the humidity and temperature of the atmosphere, besides allowing of the most convenient arrangement of the machinery, both for employer and employees. The cost of building and belting in this manner is also smaller, and the transportation of materials from place to place is greatly minimized.

It must be kept in mind from the beginning that by arranging rooms and machinery, so that material will not have

to go over the same ground twice, the cost of working the mill will be greatly reduced. A cement flooring for the weave room is best, and holes can be drilled into the cement to insert dry wooden plugs for the loom feet to rest upon, and large nails are then driven through holes in loom feet into the wooden plugs. The moisture from the ground will swell the plugs and so hold the nails and loom to the floor securely. The weaving room should also have a span roof, if possible, with the bays running from east to west and the glazed portion facing north. A north light is the greatest and the steadiest, and the sun's rays do not penetrate into the rooms and absorb the moisture.

The slated portion of the roof of a weave room might be coated with lime wash each Spring, which will tend to give a steady white light through the blazed portions, thus increasing the light of the building considerably throughout. The arrangement of the columns and girders throughout the weave room depends largely upon the class of looms to be installed, as it will be found that more strength would be needed in these materials if erecting a Jacquard weaving room than if only plain or dobby looms are to be used. The preparatory rooms and their machinery must be planned to give easy access for the materials used by them and allow of being transferred to their order of process at a minimum of cost and time, which will tend to decrease the expenditure of the working of a mill. A superintendent who is fortunate enough to have a mill in his charge built with the foregoing advantages of mill erection has one-half of the battle won in operating his mill with a good margin of profit.

## STARTING UP OF NEW LOOMS.

BY J. W.

The starting up of new looms may seem to be a very simple matter, but it is one of the most important problems in the successful operation of a mill, for a new loom can at the commencement either be made to do good work or very poor work, according to the manner in which it is started up. As the loom comes from the shop, it is in a number of cases supposed to be nearly ready for operation, all that is necessary being to put on the various connections. In getting ready to start up the loom, it is considered a good idea to have the fixers and helpers each do a certain portion of the work. For instance, a boy should precede the others and wipe off the grease, etc.; another helper should take off the pick ball caps and see that the portion of the picking shaft on which the ball works is properly greased or oiled.

While the caps are off, it is by some mill men considered a very good plan to put a small piece of leather under the cap; the reason for doing this is that the pick cap bolt does not loosen up so easily. Other helpers should be putting on the top roll straps, lug straps, heel straps, etc. A number of the fixers should follow and set the pick cams, treadle cams, and then put on the belts and start the loom running empty. It is of a great benefit to a loom to be able to run the loom without a warp for a number of hours, as it helps to limber up the loom, and will give the fixer a chance to tighten up the bolts, which are liable to work loose.

Before starting up a fancy warp in a new fancy loom it is considered a great help if a plain warp can first be run out before starting up on fancies. Some mills have a fixer start on one loom and do all the work on that loom, but this is a very expensive way, as a helper or learner can put on the various straps just as well as an experienced fixer can. Another point to be watched for very closely is to have the looms as nearly level as can possibly be obtained; also the shuttles should be of the same size and weight. If the shuttles are not the same size and weight good results can not be obtained. If one shuttle is smaller than the other, it will rebound, while if they are of different weights, more power will be required for one than for the other.

## METHOD OF PLAIN SHEDDING.

BY J. T. M.

As shedding by cams is the most perfect method ever devised, they are generally found on looms weaving from 2 to 5 harness work, and sometimes more. The principal fabrics woven by cams are, plain, twills and sateens. Then there is the dobby method of shedding. This is produced by a complicated form of mechanism known as the dobby head, which is generally set at the right hand side of the loom, on and at the end of the arch. Thus, this method operates the harnesses from an entirely opposite direction to the cam method, as it is operated on the top of the loom, and cams are operated underneath the loom.

In setting the cams to operate in due time to prepare an open shed for receiving the shuttle as it is thrown from the box by the picker stick, the following method is used: Turn the loom until the crank shaft is on its bottom center; loosen the set screw which attaches the cams to the cam shaft; turn the cams until the treadles are exactly level, then tighten the set screw in the cams while in this position. This will bring the harnesses level when the reed is about 2½ inches from the fell of the cloth. If the cams are set so that the harnesses are level before the reed reaches this point, or before the crank shaft reaches its bottom center, they are set too early, thus the term, "set early." If on the other hand, the harnesses do not come level until the crank shaft has passed its bottom center, they are set too late, thus the term, "set late."

The next point is to see that the proper size shed is formed. The size of the shed is easy to regulate and is accomplished by the strap attached to the treadles from the harnesses. After the proper size of the shed is obtained, the operator must then see that when either harness is depressed, the yarn is not brought down too heavily on the raceplate. Turn the loom until the crank shaft is on the back center; this brings one harness down on the race plate and the other raised to its highest extent. See that the bottom shed is not bearing down too much on the race plate, but set it as near to without touching the race plate as possible. If it is higher than above stated, the yarn gives the shuttle an upward tendency, thus causing it to come out of the loom. If too low the threads are liable not to weave in. To complete the setting turn the loom until the crank shaft is on the back center again, thus it will have operated one pick, and the harness that was raised in the first instance will be depressed, and it can be adjusted to the race plate in the same manner as with the first harness.

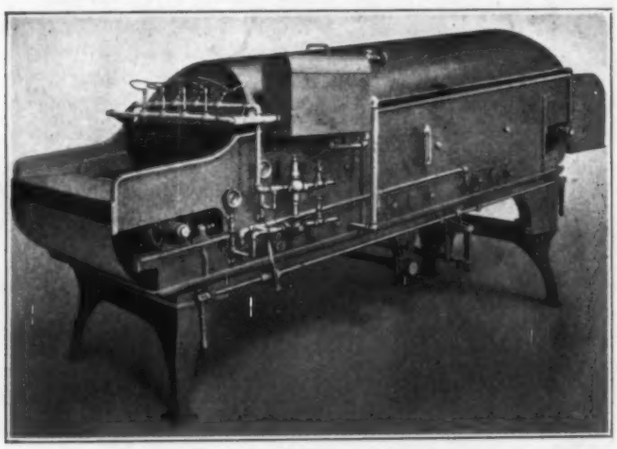
Millions of yards of duck, 46 inches wide, are used annually for the purpose of filtering oils.

# NEW MACHINERY AND TRADE NOTES

## AMOSKEAG YARN CONDITIONER.

This machine as shown in the accompanying illustration, is used for preparing filling yarns for the loom, and is built by C. G. Sargent's Sons Corporation, Graniteville, Mass. There were previous to the introduction of this machine, several methods of conditioning yarns, which may be placed under the following heads: (1) Steaming, (2) Sprinkling, (3) Dampening, (4) Immersing, and (5) Ageing. These methods are applied differently by different mills, and have not proved altogether satisfactory.

The Amoskeag filling yarn conditioning machine treats the yarn uniformly, and the results are very satisfactory. In using the machine, the mill provides a selecting table, which is butted up flush with the feed plate of the machine. The bobbins, brought in trucks or boxes from the spinning room, are dumped upon the selecting table, from which point the operator pushes them forward to the traveling apron. While passing through the machine on



Amoskeag Yarn Conditioner.

the apron the bobbins are subjected to a very moist atmosphere of from 90 per cent. to 100 per cent. humidity. The moist atmosphere is obtained by the use of Turbo-Humidifiers placed outside the front end of the copper hood, the latter having suitable apertures through which fine sprays of water are introduced. The fact should be emphasized that the bobbins are not sprinkled.

The Turbo-Humidifiers are used not only from their ready adaptability to this particular machine, but from the fact of their ability to inject currents of finely pulverized water, giving a lively foggy atmosphere beneath the hood, with little surface condensation on the yarn or bobbin. Further agitation of this atmosphere, as well as the requisite temperature, both of which increase its penetrating qualities, is obtained by the introduction of three perforated steam pipes beneath the wire-cloth apron. Each of these pipes has two rows of small holes at right angles, and at 45 degrees from the vertical.

A shaft conveniently located at the side of the machine, and with a handle at each end, shifts a belt which starts and stops the apron. Suitable connection is made between this shaft and a governor valve, so when the apron is stopped the steam supply to the perforated pipes is shut off. By this arrangement no direct steam comes in contact with the bobbins, as they may lay upon the apron when the latter is stopped. An angle-valve controls each perforated pipe. A pressure gauge shows the pressure on these pipes, and there is also a supply valve which may be used for controlling the amount of steam to the whole system of perforated pipes.

The humidifiers draw water from a constant supply tank attached to the machine. The level of the water is controlled by an overflow and float valve. The humidifiers may be arranged to inject the proper amount of spray either by the use of compressed air or steam, the arrangement of piping being the same in either case. A pressure gauge constantly shows the pressure under which the heads are working. A reducer valve is furnished which reduces the pressure from any excessive supply pressure to that under which the heads are designed to operate. A supply valve is also furnished. A thermometer located at the side of the machine shows the operator the temperature under the hood. It will be seen that a swing doffer bonnet is provided at the doffer end of the machine. Boxes or trucks are placed under this to receive the conditioned yarn.

All condensation is provided for by a pan under the working parts. The working parts are all accessible and well outside, away from moisture. The machine is well protected by copper, brass, and galvanizing, in order to preclude the possibility of stained yarns from corrosion. The use of this machine, it is claimed, results in the thorough conditioning of the yarn. The amount of moisture absorbed can be positively controlled by the regulation of the steam and water, also by the exposure caused by the speed of the apron. It is, moreover, claimed that due to a scientific treatment, the yarns tend to have a softer feel, which is an advantage in the finished goods. Another advantage derived from its use is the annihilation of bobbin difficulties. The peculiar atmospheric conditions maintained are such that a very rapid absorption of moisture by the yarn is obtained. The exposure is so slight (about thirty seconds) that the wooden bobbin has no time to absorb moisture, therefore warping and shrinking of same is obviated. The use of enameled bobbins is unnecessary. The moisture so thoroughly and quickly permeates the yarn layers that the bobbins can go directly from the machine to the weave room without and intermediate ageing, although it is perhaps better to allow a few hours' delay between conditioning and weaving. No great stock of yarns and bobbins need be kept in process between the spinning and the weaving.

By the use of the selecting table attached to the machine as previously explained, detection of imperfect bobbins is permitted at the same time as the machine is being fed. As there is little or no escape of steam or drip water, the conditioner may be located directly in the spinning room.

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Eureka Fire Hose Mfg. Co., announces that its Western territory, including the states of North Dakota, Montana and Wyoming is now under the management of W. S. Nott Co., Minneapolis, Minn., who will be pleased to answer all inquiries relating to fire hose.

## THE NASON-VESUVIUS STEAM TRAP.

The steam trap, according to the accepted definition, is a mechanism for draining condensation from the steam system, and according to the manufacturers' definition, it is the most abused steam specialty in use to-day. Unlike reducing valves and other devices for automatically regulating and governing steam conditions, steam traps are placed in dark corners or in obscure pits, where, instead of being able to get at them, the engineer is more likely to forget their existence. Occasionally, say every six or eight months, the engineer may open up the trap and find that the outlet valve is scored and cut away, and he also discovers that his coal pile has been leaking through the trap, figuratively speaking. With this condition of affairs, very little time is required to waste a few boiler horsepower, which in turn requires some few pounds of coal to generate.

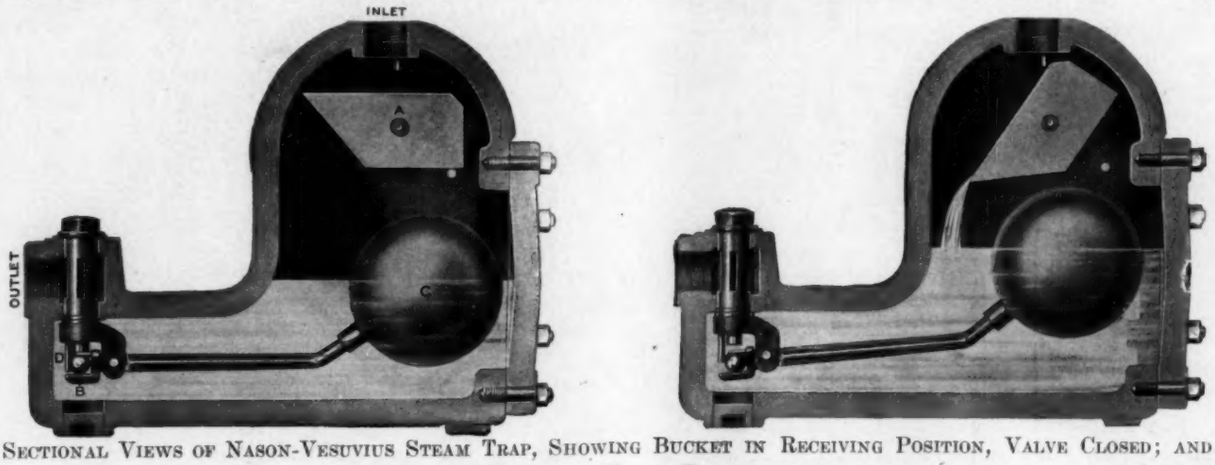
It is essential for an engineer to watch his steam traps, for they require at least a little care and attention, especially when they are used under high pressure conditions. In passing, it might be noted that a steam trap discharging once per minute, working for twenty-four hours, would discharge 129,600 times in three months. This gives an idea of the wear and tear of a steam trap. In well regulated plants, running most economically, every trap is examined at intervals of one or two months, depending upon pressure conditions. To make this regular inspection and replacement of worn parts as simple as possible, it is the aim of all trap manufacturers to obtain the simplest reliable design.

The Nason Mfg. Co., 71 Fulton Street, New York City, recently placed on the market a trap which it claims embodies this feature, and other notable characteristics that are the result of the company's experience of nearly seventy years of trap manufacture. Furthermore, the manufacturer claims that the Nason-Vesuvius steam trap is the only intermittent discharge closed float steam trap on the market to-day, with the further advantage of having a regrinding ball valve. From this long trap experience it has been found that traps of the intermittent discharge type are far more satisfactory than those of the continuous discharge type, because of the elimination of the continuous scoring of the outlet valve. To reduce the scoring of the discharge orifice to a minimum and prolong the life and durability of the working parts is the function of the regrinding ball valve.

It will be noted from the accompanying illustrations that the method of removing the ball B from the seat is such that a rotating motion is imparted to the ball at each discharge, thereby insuring a different seating surface at each closing of the valve. The simplicity of the design, accessibility, ready removal and replacement of the working parts, and the large discharge orifice, which insures absolute immunity from clogging and ample capacity for maximum conditions, are all features which must appeal to the engineer as being as vitally important as the regrinding ball valve.

### Operation of the Trap.

When the trap is placed at the lowest point to be drained connection is made at "inlet," the outlet being closed by the ball valve B. The incoming water is received in the copper tilting bucket A, which is so balanced that when filled it tips, instantly precipitating its contents into the main body of water. The quick upward impulse imparted to the float C by this discharge removes the ball B from its seat, allowing a clear, free way for the discharge. In closing, the float follows the receding water level and gradually returns the ball toward its seat, until a predetermined level is reached, when the pressure picks up the ball and instantly seats it, thus closing the orifice until the above described operation is repeated.




Sectional Views of Nason-Vesuvius Steam Trap, Showing Bucket in Receiving Position, Valve Closed; and Bucket Dumping, Valve Discharging.

## DANAMAR SOFTENER FOR SIZING.

The high price of cattle has had a very marked effect on all the by-products, including tallow, soap stock and other products used by textile manufacturers. Furthermore, a good quality of tallow is not easy to obtain. These conditions have led to a very marked increased demand for softeners to be used in sizing instead of tallow.

Danker & Marston, 247 Atlantic Avenue, Boston, Mass., are having a big demand for "Danamar Softener," which is a very fine and exceedingly white neutral softener. When results are compared with the cost, it is found by many manufacturers to give better money value than tallow. Most of their orders have come through the recommendation of one user to another, and any one interested in the matter can easily ascertain by reference to concerns who are using it successfully just what it does and how it works out in comparison with tallow. The cotton manufacturer is confronted with many complex questions at the present time. Not only is his raw material higher, but almost all the supplies that he uses cost more, labor is looking for higher

wages, and yet the price of cotton goods, yarns and cloth is weakening. Any chance, therefore, to cut corners and save expense without lowering quality or product should be investigated.

## BICALKY ROOF FAN VENTILATOR.

The ventilator shown in Fig. 1 consists of a vertical ventilator pipe, the upper part of which is made with a T-shaped body. One end of the latter terminates in a cone, the other end being open, and through which the air, rising from the ventilator pipe, is discharged. The ventilator is revoluble, and is provided with a cowl to bring the cone point to face the wind. The end of the outer covering is open at both ends, so that the air passes in at the end in which the cone is located, and is compressed to a certain extent as it passes to the gradually reduced space between the T-shaped body and the outer covering. The air thus passes through the space with considerable velocity. A fan is located in front of the ventilator pipe discharge opening, and is revolved rapidly by the outside air current passing into the space explained and between the blades on the periphery of the fan.

This ventilator is made by the Bicalky Fan Co., 868 Prospect St., Buffalo, N. Y. The construction is designed to give a strong exhaust from the ventilator pipe, and the bearings of the fan render it very sensitive to the slightest movement of air.

Fig. 2 illustrates a view when a test was made by the company using a 24-inch ventilator; that is, a ventilator with a 24-inch vertical pipe. This pipe was carried up 30 feet on the outside of the building, which afforded a large cooling surface to the air going through the pipe, and offered an opportunity for a down current in it. The test was made by starting a fire in a tinner's fire pot, after which coal tar and bituminous coal were used to smother it to develop a strong smoke. The pot was then placed near the opening of the stack. The outside temperature was 14 degrees above zero. The smoke was carried up by the ventilator and issued as a black smudge as shown in the picture. This indicates something of the volume of air that was being pulled through the stack. Undoubtedly there will be times when the wind velocity would be insufficient to rotate the wheel. To provide for such contingencies the clearing space of one inch is arranged where the wheel sets in the ventilator. It will be noted that the clearance is sufficient to allow the ventilator to act when the fan is not in motion. The wheel in the particular construction shown is of special make being 24 inches in diameter where the air enters the T-shaped body and 32 inches in diameter at the discharge periphery of the wheel. The free area through the wheel is 20 per cent. in excess of the area of a 24-inch pipe. The course of the air through a ventilator is unobstructed and little resistance is offered when working on a gravity system, and it has a high efficiency for its dimension. It is claimed that under average conditions the fan gives practically the same results as if motor-driven, and at all other times the ventilator operates under the same conditions as those which have no wheels, with the advantage of less obstruction to air movement.

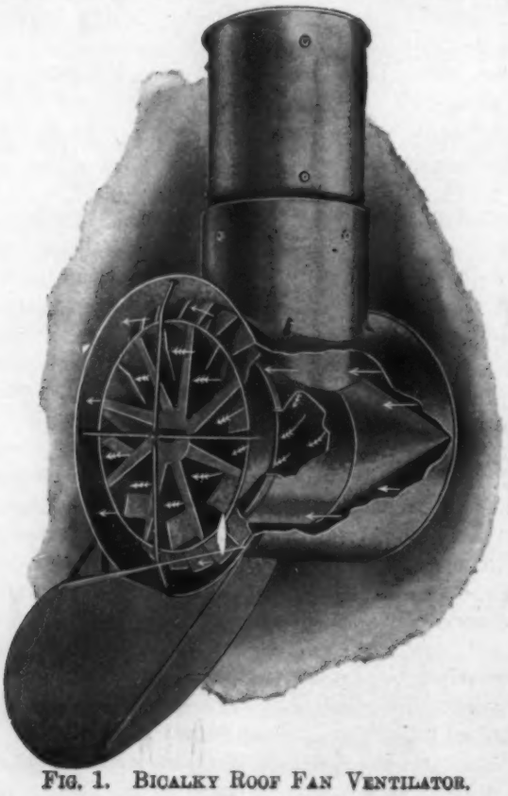


Fig. 1. Bicalky Roof Fan Ventilator.

Fig. 2. Testing a Bicalky Fan Ventilator.

## OBITUARY.

News has just come to hand of the sudden death, through heart failure, of H. Alban Ludwig, head of H. Alban Ludwig, Hosiery Machines Factory, Chemnitz, Germany. Mr. Ludwig was 60 years of age. He started this business in 1880, employing only a few hands, but through perseverance and pronounced capability, he developed it to a great extent and the factory employs to-day over 500 hands. Mr. Ludwig invented many patents and improvements on hosiery machines and was considered one of the best authorities in this industry. Though the firm experiences a very great loss by his decease, business will, however, be continued as heretofore by his two surviving sons,